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ABSTRACT

A project examined the Office of the Future and determined trends regarding an integration of word processing and data processing. It then sought to translate those trends into an educational package to develop the potential information specialist. A survey instrument completed by 33 office managers and word processing and data processing supervisors in the greater Olympia area identified how many were currently using a particular function and whether there was interest in that capability for the future. Functions were then matched with particular pieces of equipment. The relationship of job classifications to the evolution of microprocessing was determined by comparing word processing and data processing classifications of the area's largest employer of word/information processing personnel. It was determined that certain functions once associated with data processing were found to be available with word processing. Other functions showed a relationship between data and word processing. In comparing job classifications, similar duties were found to be performed by word processing and data processing personnel. Appendixes, amounting to approximately three-fourths of the report, include survey instruments and results, job classifications, outlines for three proposed courses, and curricula for word processing specialist, terminal operator, and information management. (YLB)

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# THE INTEGRATION OF WORD PROCESSING WITH DATA PROCESSING IN AN EDUCATIONAL ENVIRONMENT

FINAL REPORT

Project No. 81-AKW(187)NN

Curriculum Development Project
Conducted Under Public Law 94-482

Lorna Patterson, Project Director
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April 1982

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RESEARCH COORDINATING UNIT
Washington State Commission for Vocational Education

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The project reported herein was performed pursuant to a grant from the Research Coordinating Unit of the Washington State Commission for Vocational Education. Contractors undertaking such projects under the Commission for Vocational sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Commission for Vocational Education position or policy.

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## SUMMARY OF THE REPORT

### Time Period, Objectives, and Procedures

The project was begun in late June of 1981 with a literature search, scheduled equipment demonstrations, and consultations with a Systems Design Analyst with the Department of Transportation, who was a partner in the project. Other practitioners in the word processing field, as well, were consulted in order to plan an appropriate design for evaluating the status of the much-talked-about Office of the Future. The purpose of the project was to research that concept and to explain word processing ties to other computer equipment. Often the concept is referred to as the marriage of word processing and data processing. Some like to think of it as a brother-sister relationship. Although the field is still evolving and word processors view it in one way and data processors view it another, the trend reflects a possible obliteration of a difference. The line between functions is getting fuzzier.

By early September a survey instrument, which included a comprehensive list of defined functions organized into stroke-reduction features, corrections and revisions, multipage documents, statistical, repetitive letters, lists, logical operations, storing on external media, etc., was designed and mailed to 35 word processing supervisors and 35 data processing supervisors in state government, the largest employer in this field in the Olympia community, and to 20 larger firms in private industry. Responders were asked to indicate whether they were presently using a particular function, whether they had interest in having it in the future, when they might consider adding the function. Thirty-five people responded with 33 answering in time to be included in the statistical analysis, which was completed in October.

In addition to the objective of surveying the word processing and data processing community to help in determining functions appropriate to the office of future, another objective was to match those functions with particular pieces of equipment. The survey form, with a few minor changes, one of which was a listing of price ranges, was converted into a format for checking which functions were applicable to particular models. The equipment categories of standalone display, shared logic and multipurpose systems were chosen for the comparison, as they offered features appropriate to the office of the future. For each category, three manufacturers, who represented the leaders in that category at the time, were used.

The next objective was to determine the relationship of job classifications to the evolution of microprocessing by comparing word processing and data processing classifications of the area's largest employer of word/information processing personnel. Word Processing Operator 1, 2 and Specialist were compared to Data Entry Operator I, II, III, Programmer 1, 2, and Computer Systems Analyst 1 and 2.

Skills and abilities of the word processing classifications were further reviewed and matched to particular positions. The latter objectives were dealt with through January.

## Results and Accomplishments

Through the use of a survey instrument, certain functions once associated with data processing were found to be available with word processing. For example, the sort and select function, where fields of data can be stored and can be used to create new reports following certain machine instruction, is now one of the features users are looking for in word processing equipment and that is becoming more commonplace. For example, over 60 percent of the responders were adding or deleting records from one file to another.

Other important functions showing a relationship between word processing and data processing were: merging, automatic routines for multipage documents, blocking and global search routines. A number of areas now covered by the recent availability of software are: communications, statistical, dictionary, graphics and forms, electronic mail. The percentage of use for these particular applications ranged from 30 percent to 84 percent. The areas experiencing a low percentage of use were often shown as having a strong interest for future adoption.

Standalone display-based systems, shared-logic systems, and multipurpose computer systems are replacing the standalone mechanical system typically found in the classroom. The project includes a form for each of those categories that matches a particular equipment model with functions, including their price range. Further, hardwired displays, where the system logic is permanently wired, will generate less interest than software based systems. In the software-based system, the logic is stored on magnetic media, allowing for ease of upgrading.

In comparing job classifications, Word Processing Operator 1 and 2 and the Word Processing Specialist perform similar duties as those performed by the Data Entry Operator I, II, III, Programmer I, II, and System Analyst 1, 2. With the change in technology, some of the same knowledge required for those in data processing is also required for those in word processing.

## Evaluation

The information gathered did validate the changing nature of work and the changing nature of the office. The survey allowed for determining what functions were presently used, and it indicated which had high interest. The 36 percent return might have been improved if the Governor's survey had not preceded this one. Reliable trade sources were used in the literature review, which pointed even more definitely to the need for communications, for example, than did the survey. Using equipment demonstration as a source for learning about significant functions had to be repeated, so that there could be a consistency of comparison through the use of the list of defined functions.

## Conclusions and Recommendations

The functions analyzed and the state personnel classifications compared did point to a need for understanding programming concepts, systems analysis, and telecommunications. As a result, it's recommended that those courses, which presently would not be the same as those required for a data processing major, be added to the curriculum. Additional classifications should be developed beyond Word Processing Specialist in order to reflect the skill required to operate the present-day multifunction equipment. A new curriculum, which is included in this report, should be introduced to reflect the emphasis on information processing. That curriculum would not only offer those equipment and language skills associated with word processing but also include management and introduction to data processing, in addition to the three courses already mentioned. A plan for a student service center is also included, which will allow for the practice of those skills pertinent to the changing nature of the office.

## PROBLEM AREA TOWARD WHICH THE PROJECT WAS DIRECTED

As the functions of word processing systems more closely resemble those of data processing, an integration of the two is evolving under the umbrella, information processing. Users of automated typing equipment are becoming more insistent in their desire to have both word and data processing capabilities available on a single system. Every person in the private and public sector today must face the problem of dealing with increasingly large quantities of information produced in the daily operation of the office. With emphasis on speedier, more widely varied document creation, faster output, rapid information retrieval, and communication between remote workstations, there is a dramatic need to change the office structure. The purpose of this project was to capture those trends and translate them into an educational package that will equip the educator with the necessary tools to develop the potential information specialist.

To have a clear picture of the office workplace, the last frontier of automation, and its dramatic move toward productivity and cost efficiency, a number of sources were utilized. They included:

1. A survey instrument sent to 90 potential responders, primarily in state government, as the largest employer and user of word processing/data processing technology in Community College District Twelve's service area.

2. Numerous articles from such trade journals as Word Processing and Information Systems, Modern Office Procedures, The Office, and Data Processing Digest.

3. DataPro Research Corporation's collection of materials.

4. A report from Governor Spellman's Information Systems Reorganization Task Force for the State of Washington.

5. Conversations with vendors.

6. Conversations with advisory committee members, as well as others from the community currently involved with word processing.

Although these sources point to a great deal of attention being given to the office environment, commonly referred to as the "office of the future," the educational community risks lagging behind in its attention to the office, as curriculums are developed around the technology of the text-editing, input-output hard copy system of the 1970s. Resources in Education and college catalogs show no indications at the time of the study of a move to the office of the future--a concept on the horizon.

## OBJECTIVES

The primary objective of the project was to examine the much-talked-about Office of the Future--how technology is put to use in automating business communications. Since that "office" reflects a system approach and an integration of word processing and data processing, then the educational environment should reflect those same concepts. Hence, the following objectives became part of the project:

to survey the word processing and data processing community

to define the office of the future

to explore the changes in the office structure

to determine the job classifications evolving from the change

to design a curriculum that mirrors the flexibility and complexity of that changing office

to determine necessary word processing and data processing skills level

to create applications to incorporate those skills

to develop a plan for a word processing/data processing service bureau manned by students

to develop criteria for choosing automated equipment

to allow business educators to become familiar with word processing and data processing functions

## PROJECT DESIGN AND PROCEDURES

### Survey Design

Besides evaluating current literature and consulting with known practitioners of word processing, a survey instrument was designed and sent to office managers, and word processing and data processing supervisors of the greater Olympia area. (See Exhibit A).

Sample. The sample included, in state government, 35 word processing supervisors and 35 data processing supervisors; in private industry, 20 larger firms--law, engineering, brewing, and timber. The Word Processing Association and the Data Processing Managers Association membership roster were used to develop the list of potential responders. That information was acquired through advisory committee input. In the case where there was not a word processing manager as in certain private firms, the office manager was used as the contact. Because both word processing and data processing managers were used in the sample, some state agencies were, therefore, contacted more than once, and in some cases, probably elected to have only one word processing manager fill out the form. Thirty-five people responded with 33 answering in time to be included in the statistical analysis.

Purpose and Method. The purpose of the survey was to identify not only how many were currently using a particular function but also whether there was interest in that capability for the future. If they weren't currently using the function, the responders were asked to indicate the degree of interest for future application on a scale of 0 to 10, with 0 representing no interest and 10 representing a great deal of interest. They were also asked to project when they might implement the function between 1 and 5 years. In calculating the responses, if the function was used, the yes response was tallied as a 1; if not used, the no response represented a 0. The total number for each function was translated into the percentage of responders making use of that particular application. See Exhibit B for the survey results. The results also indicated the number of raters interested in that function for the future, the average degree of interest, and the projected implementation time period of 1 to 2 years or 3 to 5 years.

Functions. The functions, which ranged in sophistication from "line-oriented" text editing to data-processing-like intelligence, were organized into logical categories. They included stroke-reduction features, corrections and revisions, multipage documents, statistical, repetitive letters, lists, logical operations, storing on external media, document history, display, hyphenation, communications, hardware configuration, printing, operating system, storage media, peripherals. An element not usually seen in survey design was a definition of each of the functions appearing below the previously-mentioned headings. The label given to the function might vary between word processing and data processing settings. Therefore, definitions served to standardize the information. In addition, some responders might not have the advantage of sophisticated equipment and therefore not have the knowledge of what is available.

The word processing/data processing functions incorporated into the survey were researched through DataPro Research Corporation's materials, demonstrations given by a number of vendors, and conversations with users in the respective fields.

Matching Equipment to Functions

The next major step in the project was to match functions with particular pieces of equipment. There has been such a proliferation of manufacturers of word processing equipment (over 100 vendors and the number continues to climb) that it became impossible within the timelines of the project to prepare a grid or display attaching functions to all available equipment. Instead, the survey form, with a few minor changes, was converted into a format for potential purchasers to check the functions made possible by particular models of equipment. Thus, the form became the list of criteria for selecting equipment best suited to newly integrated office functions. In addition, it included a section for indicating the price range. (See Exhibit C).

Word Processing equipment can be divided into certain categories. For the purposes of the project, the following categories were viewed. However, only standalone display, shared logic, and multipurpose systems are applicable to the Office of the Future's tie to data processing.

Electronic Typewriters. Electronic typewriters take their place at the low end of the word processing market and represent a logical upgrade for existing users of electric typewriters.

Standalone Mechanical Systems. Standalone nondisplay word processors have a keyboard/printer combination that is coupled with an internal memory, a self-contained edit and control logic, and a magnetic media recording device. The printer, which is usually selectric or "daisy" wheel, is used to generate text for editing operations as well as for outputting the final document.

Standalone Display Based Systems. This type of word processor replaces the keyboard/printer, for text is keyed, edited, and changed on the display before printout.

Shared Logic Systems. These systems share the logic, storage, and peripherals of a central computer among a number of keyboard editing stations. Exhibit D describes the capabilities, for example, of one of the shared logic systems chosen for comparison.

Multipurpose Computer System. The computer capability allows both word processing and data processing functions to be performed, especially in the case of large, complex documents.

Equipment as Applied to Categories. Standalone display-based systems, shared-logic systems, and multipurpose small computers, since having both word processing and data processing capability, were chosen as the categories in which to compare equipment. Three pieces of

equipment were used for each of the categories. They were chosen on the basis of their significance at the time of the study. Who's in the lead position may change often, given the rapid advances in technology. Unfortunately, Wang, one of the vendors chosen, did not have information available in time to be included with the others. The main purpose, however, was to show how the form could be used by educators and others to not only make equipment comparisons, but also to learn, with the least amount of confusion, what functions were available in the market and at what cost.

## The Governor's Task Force on Office Automation

The governor has formed an Information Systems Reorganization Task Force in order to deal with some of the issues related to office automation in the State of Washington. One of the issues is the lack of statewide policy in planning for, acquiring, and using office automation equipment and software. The outcome has been the installation of incompatible word and data processing devices, some of which have had to be interfaced through the use of little black boxes. The governor's office surveyed the 39 Olympia-based agencies, where 77 different models of word processing equipment were reported in used.

Another issue is that the State personel system does not presently included classes for operators of equipment that have multifunctions. For example, there is a classification for a Word Processing Operator and another classification for a Computer Terminal Operator. However, there is no classification that accounts for the dual function.

## State Personnel Classifications

To determine the relationship of job classifications to the evolution of microprocessing technology, word processing and data processing classifications of the area's largest employer of word/information processing personnel were compared. Word processing classifications for the Washington State Department of Personnel are

Word Processing Operator 1
Word Processing Operator 2
Word Processing Specialist

Word Processing Center Supervisor 1 & 2
Supervisor, Secretarial Support Center
Word Processing Manager

The first three were recently revised in April 1981; the last three, which are supervisory positions, became new classes in 1980, except for the Secretarial Support Supervisor. Supervisory positions were not considered when making the comparison between word processing and data processing because of the commonality of management duties across similar levels in State government. Word processing as well as data processing job descriptions for each of the classifications mentioned are found in Exhibit H.

Although there are many more job classifications and therefore more career options for the data processing person with the State, the following data processing classifications were used in the comparison:

Data Entry Operator I
Data Entry Operator II
Data Entry Operator III
Programmer 1
Programmer 2
Computer Systems Analyst 1
Computer Systems Analyst 2

To further show the possible range of job classifications found in word processing, the following represent those recommended by the International Word Processing Association. A description of each appears in Exhibit I.

Word Processing Trainee
Word Processing Operator
Word Processing Specialist I
Word Processing Specialist II/Assistant Manager
Phototypesetting Specialist
Word Processing Trainer
Proofreader
Word Processing Supervisor
Word Processing Manager
Administrative Secretary
Senior Administrative Secretary
Administrative Support Supervisor
Staff Analyst
Administrative Support Manager
Director of Information Support Systems

## Matching Word Processing Classifications with Skills

The Washington State Department of Personnel specifications for the three operator and the three supervisory word processing positions are presented in terms of the function's definition and distinguishing characteristics and in terms of the applicant's knowledge and ability and minimum qualifications. A list of the skills and abilities found among the six job classifications was prepared and them matched to a particular position. Appendix J shows the relationship of the skills to the job.

## RESULTS AND ACCOMPLISHMENTS

Having to prepare a survey instrument meant preparing a detailed description of the word processing and data processing functions so that there was no risk of misunderstanding the label given to the function. A result was an instrument to not only survey what functions are utilized in the work environment but also research what functions are available from various vendors when planning equipment needs. Knowing and understanding the nature of the function helps in determining the organizational requirement.

Another result emanating from the survey is the determination of what functions are widely used; hence what needs to be taught. Exhibit B indicates the survey results--what percentage of the responders are using particular functions and whether there's a future interest.

### Implications of Certain Survey Questions

To determine the relationship between word processing and data processing and the extent to which their functions demonstrate a similarity required an examination of certain key applications, some of which follow:

Merging. The merging function listed on the survey represents a blending of fixed text with names, addresses, and other variable information. Of those responding, 93 percent indicated the use of the merging function. At another level, an operator could type in variables or switch between two media stations (one with a letter, one with a listing). More sophisticated equipment allows the variables to be stored as fields of data base, with the coded letter accessing the proper field for the appropriate variable information. In some systems, the operator can apply logical considerations to the selection of addresses or perform sorts, i.e. all those with zip code 98502 or everyone who submitted a project to the Commission for Vocational Education.

Files Sort and Select. The sort and select functions once associated solely with data processing allow lists to be created and updated. A list with a large number of fields can be stored, then selects and sorts performed to create a number of new reports. Information can be output in the desired order, with new headings, and in sophisticated formats. The section on "Lists" was to determine whether these applications were used by the responders. In addition, the updating, manipulating, and sorting categories were meant to determine the need for systems analysis, so that the individual could prepare a logical set of instructions and procedures for rearranging the data. Over 60 percent were adding or deleting records from one file to another, moving or adding new fields or records within a file, or updating fields selectively within a record. Selecting records by combinations of criteria and rearranging them in ascending or descending order were also used to a similar degree.

Automatic Routines for Multipage Documents. Similarly, long documents call for data processing-like functions, for example, automatic footnote tie-in, automatic repagination routines, automatic table of contents, footnoting, headers and footers, super- and subscripts--all listed on the form under multipage documents. Automatic page numbering allows for the redivision of pages on the basis of line count, followed by a renumbering. In some cases, text will be removed or added to pages as required to maintain page length. Because of complexity of operation, automatic footnote tie-in, typing footnotes to appropriate text segments even if moved to another page, and automatic table of contents, the updating in response to additions and deletions, are frequently unavailable on word processors. The operator would then be required to apply some concepts of accessing the computer via data communications. Pagination showed 87 percent making use of that function; automatic footnote tie-in, 42 percent; automatic table of contents, 27 percent. Around one-third of the responders expressed an interest in both functions for the future.

Blocking and Global Search Routines. The ability to move blocks of text from page to page, and global (string) search routines, to allow changes to be made throughout a document with a single command are other data processing-like functions that are becoming more commonly used. Some sophisticated systems allow logical considerations to be applied to global search and replace routine ("change OTCC to Olympia Technical Community College"). The percentages of current use, 81 and 72 percent, respectively, are found under copy block and global search and replace.

Printing. The section on printing was structured in terms of quality and volume requirements rather than on labeling the kind of printer i.e. impact, ink jet, or laser. Instead, the requirement for font typeface per page--single or multiple--charts/graphs, photo-composition for publication, and print speed dictate the type of printer required. For example, if there were a need for having a single font typeface per page at only 10-50 pages per day, a laser printer would not be needed. However, if there were a need for multiple font changes, photocomposition, lasers or some other, more sophisticated printing mechanism would be required. Likewise, if the volume of pages printed is more than 100-350, ink jet printers, multiple printers, or a shared logic system would be required. The survey form showed that presently 72 percent of the responders were using single font. Yet 45 percent had a multiple font requirement; 39 percent, charts and graphs; 18 percent, photocomposition.

The availability of certain application programs is bringing word processing and data processing closer together. A number of those applications follow.

Communications. Communication options allow the word processor to transmit information to a large computer or to other word processors in satellite locations. The results of this communication may become part of the main computer's data base or may be communicated back to the word processor as a report or other text. The "Communications" section of the form was meant to determine the level of complexity of currently used or anticipated systems. Generally, the more pages to be

transmitted per hour suggests a modem requiring a different capacity and speed. For example, under 20 pages per hour would require a 300-bit-per-second asynchronous modem; 50 to 100 pages per hour, a 2400-bit-per-second synchronous modem. As more pages are communicated at a faster rate, there's a need for more sophisticated hardware and software, and at the same time for additional skill levels. Those skills employed for transmitting messages involve determining code sets, line protocol, line speed, transmission modes, mode switching, automatic sending and answering, polling, and system compatibility. Only 12 percent of the responders are currently using communications, but 33 percent indicated a strong interest in making use of it in the future.

Statistical. With the increase in mathematical capability as a standard feature, word processors can subtotal, total, average, figure percentages, and compute complex problems, emulating simple data processing applications. Formulating an equation, interpreting the results, preparing a statistical column of data, where columns may represent a mathematical expression, require programming concepts. Of those responding, 48 percent used columnar interchange; 69 percent, decimal alignment, and 33 percent math pack and edit. At least a third expressed a high interest in those functions for the future.

Dictionary. Equipped with a large dictionary, spelling programs allow a machine, upon operator command, to scan a document and look up every word in the dictionary. When it finds an incorrect or unknown word, it signals the operator that a spelling correction is required. "Dictionary" had a 30 percent use figure.

Graphics and Forms. As part of a graphics software package, the capability to produce bar graphs, pie charts, and simple illustrations is becoming more prevalent. Of those responding, 27 percent indicated a current use of that function, with another 33 percent indicating a need in the future. The forms software package, of which 33 percent expressed a use, allows for preparing invoices, purchase requisitions, and other forms individualized for a particular setting. Being able to customize through graphics or forms requires knowledge of systems analysis, usually associated with data processing.

Other Programs. Some of the other programs for selected users are:

| | |
|---|---|
| Finance | Payroll, budgets, accounts receivable, accounts payable, and billing. Billing programs, for example, will enable doctors, dentists, lawyers, and other professionals to keep track of time and services provided to clients. |
| Manufacturing | Production scheduling, shipping materials, ordering, and inventory control. |
| Marketing | Sales analysis, sales control, advertising, and promotion. |

Other available offerings include calendaring meetings and scheduling appointments, logging incoming/outgoing correspondence, handling telephone messages, maintaining a directory of frequently used numbers, and tracking documents.

And for even more sophisticated applications, a few word processors permit operators to write original function programs with a user language called Basic. Many also include electronic spread sheet programs, such as Visacalc and Supercalc.

Software, a concept usually associated with data processing, is now part of the word processing realm. The survey form revealed that 51 percent of those responding did have an operating system dependent upon software, some of which was user programmable rather than manufacturer preprogrammed.

## Matching Equipment to Functions

Viewing equipment by categories offers the following breakdown of functions:

Electronic Typewriter. Offered at a price below most text-editing units (from approximately $2,000 to $4,500), electronic typewriters feature small buffer memories for minimal text or phrase storage and recall. They share a number of features with other standalones such as automatic return, error correction, centering, underscore, indent, decimal tabulation, and line spacing, and some have a "thin window" display--features that facilitate the keyboarding and revision of text on a first-time-final or limited revision basis. The present leaders in this category are Qyx, Olivetti, and IBM.

Standalone Mechanical Systems. Common functions are automatic center, decimal tab, indent, return, etc. Although not reflecting the tie-in to data processing represented by this report, standalones are still present in industry and are particularly present in educational settings. These systems are best suited for automatic letter writing and other page-oriented applications. They have ranged in price from $4,000 to $10,000. They may be no longer manufactured since display based units are sold in a similar price range.

Standalone Display Based Systems. This type of word processor replaces the keyboard/printer, for text is keyed, edited, and changed on the display before printout. Certain models will allow the operator to draft or edit new documents as the typewriter plays out previously displayed work simultaneously. (See Exhibit E)

Functions that are found with video display systems are:

| | |
|---|---|
| auto word wraparound | column move/delete |
| auto carrier return | auto footnote |
| auto page numbering | dictionary/glossary |
| auto headers/footers | math capability |

| | |
|---|---|
| auto pagination | auto sub/superscript |
| global search and replace | justified right margin |
| block move/copy | buffer memory system |
| files | merging files/text |
| forms | |

These units are priced from $8,000 to $20,000, depending on the sophistication of operation. As users are shopping to upgrade equipment, the above functions are the most commonly looked for. The functions described for the standalone mechanical, such as automatic center, are considered standard and available without question.

Shared-Logic Systems. Sharing the intelligence of the Central Processing Unit (CPU), a minicomputer, individual keyboards are able to perform the word processing tasks outlined previously but with a greater editing capability and larger storage capacity. Because a printer is shared as well, printout queuing, where a number of documents can be "lined up" for subsequent printout, is utilized. Maintaining a calendar, providing a tickler file, performing an electronic mailbox, file indexing, and maintaining lists and records are some of the functions found on this type of system. The price range would fall into the over $18,000 category. Although the price range for the entire system is much higher, the per station cost is cheaper. (See Exhibit F)

Multipurpose Computer System. This system has the capability of performing most functions previously outlined but at a much faster rate, since it brings together all four office equipment functions: data processing, word processing, printing, and communications. The object is to serve two types of users: those from strong data processing environments looking for more generalized multifunctions and those from sophisticated office sytem environments demanding improvements in office productivity. The system can also make use of a much larger data base. The IBM 8100, Wang VS-100, and the Prime 750 fall into this category and cost well above $18,000. The form unfortunately used $18,000 as its upper limit. (See Exhibit G)

## The Governor's Task Force on Office Automation

Although the task force is analyzing a number of issues, the one that has the strongest relationship to this project is that of job classifications. A conclusion is that state government requires classifications that incorporate the multifunction aspect of equipment and therefore of responsibility. A recommendation for such a class would be to consider introducing a information processing specialist and a senior word processing specialist, especially as word processing and data processing evolve into information processing.

## State Personnel Classifications

In comparing word processing classifications with data processing classifications (a detailed description can be found in Exhibit H), the following classifications demonstrate similar duties:

| Word Processing | Data Processing |
|---|---|
| Word Processing Operator 1 (0122)<br>Word Processing Operator 2 (0123) | Data Entry Operator I (0343)<br>Data Entry Operator II (0344)<br>Data Entry Operator III (0345) |
| Word Processing Specialist (0125) | Data Entry Operator III (0345)<br>Programmer 1 (0350)<br>Computer Systems Analyst 1 (0358) |
| *Senior Word Processing Specialist* | Data Entry Operator III (0345)<br>Programmer 2 (0352)<br>Computer Systems Analyst 1 (0348) |
| *Information Processing Specialist* | Data Entry Operator III (0345)<br>Programmer 2 (0352)<br>Computer Systems Analyst 2 (0360) |

Supervisory positions were not used in the comparison of word processing and data processing classifications; however, they were used in looking at skills required in word processing jobs.

Beginning with the Word Processing Operator 2, the need for programming and systems analysis is appropriate to the job function. The implication is not that a word processing position requires all the skills of a programmer and/or analyst but that similar skills are demonstrated when using micro-mini computer-based word processing equipment. Another observaton in looking at the above comparison is that there are more jobs available to those employees on the data processing side than those on the word processing side. The result is a more comprehensive path for advancement if someone began as a Data Entry Operator. Senior Word Processing Specialist and Information Processing Specialist, those classifications marked with asterisks, are not presently included in the state personnel's classifications, but do represent the skill needed and practiced as a result of technology.

## Matching Word Processing Classifications with Skills

Included as Exhibit J is a detailed list of the skills or abilities required of the Word Processing Operator I, II, Specialist, Supervisor, Secretarial Supervisor, and Manager according to the personnel specifications provided by the state. For example, equipment knowledge is a skill specified for the word processing operator I and II but not for the word processing specialist. Formatting knowledge is also not required for the word processing specialist. Yet the specialist is suppose to be able to design formats. If standard terminology were used in describing the skills, then differentiation between classifications would be clearer. In addition, the inference is that supervisory personnel represented by the word processing supervisor, secretarial support, and manager have very little knowledge of equipment functions.

## EVALUATION

The project represents an accurate portrayal of the changing nature of work and the changing nature of the office. The survey design and its implementation allowed for an assessment of current practice. Although literature points dramatically to the use of highly sophisticated word processing/data processing functions, state government, the primary target group in the survey by virtue of being the heaviest user of word processing in the Olympia community, may not be in a position economically to take advantage of the potential of sophisticated word processing equipment. This could explain why a smaller percentage of responders were using communications capability, for example, when this function is characteristic of the "Office of the Future."

Some of the more sophisticated survey questions relating to capabilities available within hardware and software on word and data processors were not answered in some cases. This may reflect a fault of certain survey items, but in fact it is likely to be the fault of the industry not being able to keep its people up to date on the technological advances presently offered.

Although most items were responded to, not as many people wrote comments. A few offered qualifiers to some of the questions; a few made comments expressing how impressed they were that schools were looking in the direction of the automated office. The majority of the responders requested a copy of the results.

Two unrelated events occurring during the course of the project also served to validate the trends presented.

1. Governor Spellman's Information Systems Reorganization Task Force, which included a survey of 39 Olympia-based agencies.

   His objectives for appointing a task force were "to (1) increase the productivity of state government, thereby reducing the rate of increase in the growth of state employment, (2) eliminate unnecessary and duplicative staffing, hardware acquisitions and software development, and (3) improve the management of the state's information processing resources." Because of the explosive growth in technology, the ownership as well as the management and supervision of this equipment will, as proposed by the task force fall under the jurisdiction of one statewide super agency--the Office of Information Systems.

2. IBM's changing its organizational structure from a data processing division, office products division, and general products division to a single integrated division.

In this way a sales team could call on a customer and be prepared to recommend a product based on a total system.

Although the Governor's study was timely and informative, it may have discouraged some from responding to the survey included in this report. Since reaction to the anticipated reorganization is both favorable and unfavorable, some may have elected to not fill out two documents on a similar subject, especially when the first questionnnaire reflected a highly political as well as emotional issue. This factor may have contributed to the 36 percent return on the survey.

One of the original objectives in pursuing the office automation topic was to look at the feasibility of photocomposition. The survey form did not reveal a strong use or interest in that area. Some of the information provided by such vendors as Compugraph showed a costly system, which seemed impractical in an educational setting. In addition, the project turned out to be a larger undertaking than originally envisioned. Photocomposition and graphics would be more appropriate for a later project, where that was the only area of analysis.

In matching equipment to functions, although numerous lines of equipment were seen in demonstration, it seemed more appropriate to organize the equipment by categories and to review only three vendors. The merit of this segment of the study was more the application of a form for potential equipment purchasers to know what functions to look for. What company or model appearing to be the leader in a category is short-lived, given the speed with which the technology is developing.

The project was helpful in pinpointing skills associated with certain job classifications in word processing and data processing. Word processing operators are performing some of the same tasks as those in various data processing classes, such as the systems analyst. Having to perform some of the same function is the result of the multifunctional capability of the modern equipment.

## CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Merging technologies are leading the office to an integration of data processing, office systems, and communication. There appears to be a blurring of historical definitions of a 'computer product,' an 'office product,' and a 'telephone product.' All are becoming more alike because they are microprocessor-based systems with electronic information as the thread tying the three together. The entire decade of the 1980s represents a pivotal period for most organizations and particularly for educational institutions. One way to approach the conclusion-implication-recommendation portion of the project is to organize it into a "Look for" format. Because of the information or communications revolution our society is presently experiencing, Look for a(an):

- increase in the number of knowledge-based occupations, as over 50 percent of the jobs are found in this sector.

- reduction in the number of routine, clerical jobs because technology will eliminate the need for them. The nature of the secretaries' duties will be refined, as their jobs will become more technical and specialized with an increase in the number of computerized applications. There will be an increased emphasis on decision-making, analytical abilities, adaptability, and greater skills in communications and interpersonal relations.

- change in Washington State's Personnel job classifications to include jobs that incorporate multifunctions.

- better cost/performance ratio, as electronic equipment becomes less expensive. (For example, hardware worth $1 million in the 1950s costs less than $20 today.

- new vocabulary of technology-based terms.

- new products and services in the telecommunication industry, as the Bell-dominated oligopoly is being opened up to allow for new independent suppliers.

- change in the way manufacturers market their products.

- software-based information processors.

- need for professional managers who are capable of administering comprehensive, cost-effective information systems.

- the combining of communications, office, and data systems at the same workstation so that the end-user, who includes the professional, can create, transform, transmit, and retrieve information.

Impact on State. The impact of these "Look Fors" on the State Personnel System is the need for additional job classifications to reflect the multifunctions of the equipment. A Senior Word Processing Specialist, a sample description is included in Exhibit K, and an Information Processing Specialist would be appropriate and therefore recommended. Job skills would have to be better described and matched to job classes.

Impact on Education. The impact on education involves a change in curriculum in order to go beyond text editing. That means meeting the trend toward multifunctions. With the advent of communications, office, and data systems combining at a workstation, one way to approach information processing is to include basic programming,telecommunications, and systems analysis in the curriculum. This conclusion can be derived from the fact that a word processor, as shown through the before-mentioned functions, is a micro-mini computer, containing the same basic architecture as the larger, more powerful data processors. Word processing equipment appears to be following an evolutionary path paralleling the growth of data processors in the areas of function and available software packages. Since it appears that from now on all word processors will be software driven, programming concepts, for example, becomes particularly viable. Exhibit L provides a detailed course outline for each of the three areas needing attention. The outline includes the course scope, objectives, content, and evaluation. Although the courses are not meant to replace those found in a data processing curriculum, they will allow people currently in word processing to bridge the educational gap between word processing and data processing.

Exhibit M provides courses matched to three related curriculums--word processing specialist, terminal operator, and information management. While they all depend on a keyboard and a word processing operations knowledge (a knowledge that is becoming complex), the information processing degree focuses on systems analysis, programming concepts, teleprocessing, communications, and management. Eventually, the information processing curriculum may replace the other two.

A student service center would round out the educational package, as it represents an on-campus job experience closely mirroring the business community. To assure that it accomplishes that objective, the center should provide high quality, responsive service based on a cost-recovery principle. Users will therefore pay for the services rendered. The capability of communicating to a satellite location is another expectation parallel with business practice. Services or functions that could be expected are

Central dictation
Centralized word processing
Preparation of widely varied documents
- Correspondence
- Reports
- Tables
- Charts
- Visual aids

File creation and manipulation
Forms design
Messages sent and received between work stations
Copy services
Liaison to State Printer
Courier services
Document storage and archieval

Exhibit N reflects how billing could be performed, how budget ties to the process, and how the center should be staffed and equipped.

In summary, there may always be some highly specialized areas of data processing that will remain in the DP realm and some WP functions that can only be performed by word processors. But as more and more multifunctions continue to merge, and as telecommunications becomes cheaper, a single workstation will allow a user to perform all the tasks required to produce and distribute the final product in the office of the future.

APPENDIX 1--Survey on WP and DP Functions


| | | |
|---|---|---|
| Exhibit A | Survey . . . . . | 22 |
| Exhibit B | Survey Results . . . . . | 24 |
| Exhibit C | Equipment Criteria . . . . . | 30 |
| Exhibit D | Network System . . . . . | 34 |
| | Vendor Comparison | |
| Exhibit E | Standalone Display . . . . . | 39 |
| Exhibit F | Shared Logic . . . . . | 43 |
| Exhibit G | Multipurpose . . . . . | 47 |

EXHIBIT A

Use Now: Y, Yes N, No
Need or Plan: On a scale of 0 - 10 0, no interest
10, high interest
When: Plan to add function in 1, 2, 3, 4, 5 years

| | WP/DP FUNCTIONS | | |
|---|---|---|---|
| | USE NOW | NEED | PLAN WHEN |
| **Stroke Reduction Features** | | | |
| Automatic Center--The centering of words on a line. | | | |
| Automatic Decimal Tab--Automatic alignment of columns of decimal figures on the decimal point. | | | |
| Automatic Tab Grid--The setting up of tabs at frequent intervals, such as every five spaces. | | | |
| Automatic Indent--Carrier returns to a new indent level. | | | |
| Automatic Word Wraparound--The placement of a word which does not fit onto the line being typed onto the next line. | | | |
| Carrier Return--A return of the carrier when a certain point is reached without operator pausing to perform return. | | | |
| The ability to wrap words during margin adjust procedures. | | | |
| Document Index Generation--The identification of items within a given text that will be used to generate a document index with updated page references automatically after modification of the same document. | | | |
| Phrase Storage--The storage of certain frequently used phrases, such as "Yours truly," a return address and greetings. | | | |
| **Corrections & Revisions** | | | |
| Block--The taking of information that has been keyboarded and saving it for when it is needed | | | |
| Move Block--Moving information from one location to another | | | |
| Copy Block--Duplicating information to move it to another location | | | |
| Move block or copy block on same page | | | |
| Move block or copy block across several pages | | | |
| Character and line count--displayed when commanded | | | |
| Dictionary--The capability to check the spelling of words against a number of frequently used or technical words. | | | |
| Formatting--Allows for the changing and defining of document parameters i.e. margin and tab settings, line spacing etc. | | | |
| Default format statement--Implemented when operator fails to designate a specific format statement | | | |
| Stored multiple formats--The storing of more than one format and accessing the desired format on operator command. | | | |
| Forward or Backward Reference Modification--Definition of references previous to and ahead of the current page where changes are required because additional pages have been inserted/deleted before or after the current page. | | | |
| Global Search--The ability of a system to search for repeated occurrences of a string of characters. | | | |
| Locates the string for operator-selected deletion or replacement | | | |
| Automatically deletes all occurrences of a string | | | |
| Automatically replaces all occurrences with another character string | | | |
| Justified right margins--Forming a straight rather than uneven right margin. | | | |
| Scrolling--Allows you to see a different portion of the text than appears on the screen because the text can be rolled upward, downward, or sideways. | | | |
| Simultaneous Print--The ability to print one document while simultaneously recording new text or revising previously recorded text. | | | |
| Printout on a first-in first-out basis | | | |
| Printout allowed on a priority basis | | | |

Use Now: Y, Yes N, No
Need or Plan: On a scale of 0 - 10 0, no interest
10, high interest
When: Plan to add function in 1, 2, 3, 4, 5 years

| | WP/DP FUNCTIONS | | |
|---|---|---|---|
| | USE NOW | NEED PLAN | WHEN 1-5 yrs |
| **Multipage Documents** | | | |
| Automatic Footnote tie-in--The ability of the system to tie footnotes into appropriate text segment. | | | |
| Automatic Page Numbering--Redivision of pages on the basis of line count followed by numbering or renumbering. | | | |
| Repagination--Text will be removed from or added to pages, as required to maintain page length. | | | |
| Automatic Table of Contents Update--As pages are added/deleted to the text the table of contents is changed. | | | |
| Footnoting--Sets the bottom margin to allow space for footnoting. | | | |
| Headers and footers--Places uniform information on each page such as section numbers and title names. | | | |
| Superscripts & subscripts--The capability to place numbers slightly above or below the regular line of type where necessary. | | | |
| **Statistical** | | | |
| Columnar Interchange--The ability to switch around whole columns of numbers automatically. | | | |
| Decimal Alignment--Lines up decimal point in columns of numbers. | | | |
| Match pack and math edits--A device that adds, subtracts, multiplies, and divides columns of figures or simply verifies the accuracy of column totals. | | | |
| **Repetitive Letters** | | | |
| Document assembly--Stored paragraphs are assembled in any sequence desired to create a new document. | | | |
| Merging--The ability to combine stored text such as a list of names and addresses with a stored letter. | | | |
| **Lists** | | | |
| Files--Creates lists and prints them out according to any of the categories in that list. | | | |
| Updating--Adding or deleting records from one file to another | | | |
| --Moving new fields to records within a file | | | |
| --Adding new fields to records within a file | | | |
| --Updating fields selectively within a record | | | |
| Manipulating--Selecting records by combinations of criteria such as greater than, less than, equal to, at least | | | |
| Sorting--Rearranging information in ascending or descending order | | | |
| **Other** | | | |
| Graphic spacing--The insertion of blocks of white space where the graphic art layout will be pasted down to complete a master for publication. | | | |
| Forms packages--Features for preparing invoices, purchase requisitions, and other types of forms. | | | |
| Edit check--A feature that prevents you from making errors when filling in a form. | | | |
| **Logical Operations** | | | |
| Comparative Operations--The use of an "If" statement using compound conditions and operators to select or format data or letters. Example: "If Account is not "OPEN," then go to next record." | | | |

EXHIBIT B

WORD PROCESSING SURVEY RESULTS

SEPTEMBER 1981

| WP/DP FUNCTIONS | % of Use | Interest Raters | Interest Ave.* | Projected Implementation 1-2 yrs | Projected Implementation 3-5 yrs** |
|---|---|---|---|---|---|
| STROKE REDUCTION FEATURES | | | | | |
| Auto Center | 78 | 2 | 8.0 | 0 | 0 |
| Auto Dec. Tab | 72 | 3 | 7.3 | 1 | 0 |
| Auto Tab Grid | 87 | 1 | 7.0 | 0 | 0 |
| Auto Indent | 87 | 1 | 7.0 | 0 | 0 |
| Auto Word Wrap | 72 | 3 | 8.3 | 3 | 0 |
| Carrier Return | 60 | 5 | 7.0 | 4 | 1 |
| Margin Adjust | 78 | 3 | 6.3 | 1 | 1 |
| Document Index | 39 | 7 | 5.7 | 1 | 1 |
| Phrase Storage | 69 | 3 | 3.6 | 2 | 1 |
| CORRECTIONS & REVISIONS | | | | | |
| Move Block | 84 | 3 | 9.3 | 1 | 1 |
| Copy Block/Same Pg. | 81 | 3 | 9.3 | 1 | 1 |
| Copy Block/Sev. Pg. | 81 | 3 | 8.6 | 1 | 1 |
| Character & Line Count | 66 | 5 | 8.0 | 3 | 1 |
| Dictionary | 30 | 9 | 6.8 | 6 | 0 |
| Formatting | 81 | 3 | 9.0 | 1 | 1 |
| Default | 45 | 4 | 7.7 | 2 | 2 |
| Multiple | 69 | 4 | 9.2 | 1 | 1 |
| Forward/Backward Ref. | 54 | 6 | 7.6 | 4 | 1 |

* Based on scale of 0-10 (0, no interest - 10, very interested)
** Response is in years from date of survey
n (number of cases = 33)

| | % of Use | Interest Raters | Ave.* | Projected Implementation 1-2 yrs | 3-5 yrs** |
|---|---|---|---|---|---|
| Global Search--String Location | 75 | 5 | 7.6 | 2 | 1 |
| Auto Deletion | 72 | 6 | 5.6 | 2 | 2 |
| Auto Replace | 72 | 5 | 7.6 | 2 | 1 |
| Justified Right Margin | 84 | 2 | 7.0 | 1 | 1 |
| Scrolling | 75 | 4 | 7.2 | 1 | 0 |
| Simultaneous Print | 81 | 3 | 8.6 | 2 | 0 |
| FIFO printout | 66 | 3 | 5.6 | 1 | 0 |
| Priority printouts | 63 | 6 | 7.3 | 3 | 0 |
| MULTI-PAGE DOCUMENTS | | | | | |
| Auto Footnote Tie-in | 42 | 9 | 7.2 | 4 | 3 |
| Auto Page Numbering | 84 | 4 | 8.2 | 2 | 1 |
| Repagination | 87 | 1 | 6.0 | 0 | 0 |
| Auto Table of Contents | 27 | 10 | 7.8 | 6 | 2 |
| Footnoting | 54 | 8 | 8.1 | 6 | 1 |
| Headers & Footers | 81 | 3 | 7.6 | 1 | 5 |
| Super- & Subscripts | 87 | 1 | 5.0 | 0 | 0 |
| STATISTICAL | | | | | |
| Columnar Interchange | 48 | 10 | 8.5 | 6 | 1 |
| Decimal Alignment | 69 | 6 | 7.1 | 0 | 3 |
| Math Pack & Edit | 33 | 12 | 7.8 | 8 | 2 |
| REPETITIVE LETTERS | | | | | |
| Document Assembly | 84 | 3 | 6.6 | 1 | 0 |
| Merging | 93 | 1 | 7.0 | 0 | 0 |

| | % of Use | Interest Raters | Ave.* | Projected Implementation 1-2 yrs | 3-5 yrs** |
|---|---|---|---|---|---|
| LISTS | | | | | |
| Files--Adding or Deleting | 60 | 5 | 6.4 | 1 | 2 |
| Moving new fields | 60 | 4 | 6.5 | 1 | 1 |
| Adding new fields | 63 | 4 | 6.5 | 1 | 1 |
| Updating selectively | 63 | 4 | 6.5 | 1 | 1 |
| Manipulating | 54 | 5 | 7.2 | 2 | 2 |
| Sorting | 63 | 4 | 8.5 | 1 | 2 |
| OTHER | | | | | |
| Graphic | 27 | 11 | 5.5 | 0 | 0 |
| Forms | 33 | 9 | 4.7 | 4 | 2 |
| Edit Check | 6 | 9 | 4.6 | 3 | 2 |
| LOGICAL OPERATIONS | | | | | |
| Comparative Operations | 15 | 6 | 5.6 | 2 | 2 |
| Control Operations | 18 | 6 | 6.8 | 1 | 2 |
| Complex Equations | 18 | 4 | 4.1 | 2 | 2 |
| File Operations | 27 | 5 | 7.0 | 2 | 2 |
| Chaining Operations | 24 | 5 | 7.6 | 1 | 2 |
| STORING ON EXTERNAL MEDIA | | | | | |
| Sequential Access | 66 | 3 | 5.6 | 2 | 1 |
| Random Access | 66 | 4 | 8.7 | 3 | 1 |
| DOCUMENT HISTORY | | | | | |
| Operator Identification | 51 | 4 | 7.7 | 2 | 1 |
| Dept or Author | 39 | 5 | 8.0 | 4 | 1 |
| Document Title | 66 | 3 | 7.6 | 2 | 1 |

| | % of Use | Interest Raters | Ave.* | Projected Implementation 1-2 yrs | 3-5 yrs** |
|---|---|---|---|---|---|
| Date & Time Log | 30 | 7 | 6.7 | 4 | 0 |
| Subject Key Words | 36 | 5 | 7.0 | 2 | 1 |
| Document Archives | 18 | 4 | 7.0 | 4 | 1 |
| DISPLAY | | | | | |
| Full | 54 | 6 | 8.0 | 3 | 0 |
| Partial | 54 | 4 | 5.5 | 1 | 0 |
| Line | 39 | 2 | 3.5 | 1 | 0 |
| Dual | 6 | 10 | 6.3 | 2 | 3 |
| Cursor Movement | 78 | 2 | 7.5 | 1 | 0 |
| Horizontal only | 60 | 1 | 5.0 | 0 | 0 |
| HYPHENATION | | | | | |
| Manual | 72 | 1 | 5.0 | 0 | 0 |
| System Scan | 48 | 4 | 7.2 | 1 | 0 |
| Algorithm/Dictionary | 15 | 8 | 7.5 | 4 | 1 |
| Auto Adjust | 84 | 1 | 6.0 | 0 | 0 |
| COMMUNICATION | | | | | |
| up to 20 pg./hr. | 12 | 11 | 8.1 | 7 | 1 |
| 20-50 pg./hr. | 6 | 3 | 8.0 | 2 | 1 |
| 50-100 pg./hr. | 6 | 5 | 8.0 | 4 | 1 |
| over 100 pg./hr. | 3 | 6 | 8.5 | 4 | 1 |
| CONFIGURATION | | | | | |
| Keyboard/Printer | 33 | 3 | 7.6 | 2 | 0 |
| Keyboard Display Printer | 90 | 1 | 5.0 | 0 | 0 |
| Terminal/CPU/Printer | 15 | 3 | 8.6 | 0 | 0 |

| | % of Use | Interest Raters | Ave.* | Projected Implementation 1-2 yrs | 3-5 yrs** |
|---|---|---|---|---|---|
| PRINTING (Quality & Volume) | | | | | |
| Single font | 72 | 1 | 6.0 | 1 | 0 |
| Multiple | 45 | 3 | 7.3 | 2 | 0 |
| Multiple 3+ | 36 | 2 | 4.5 | 0 | 1 |
| Charts & Graphs | 39 | 4 | 7.0 | 2 | 0 |
| Photocomposition | 18 | 3 | 7.6 | 1 | 0 |
| 10-50 pages/day | 12 | 1 | 4.0 | 0 | 2 |
| 50-100 | 24 | 1 | 4.0 | 0 | 0 |
| 100-350 | 33 | 1 | 5.0 | 0 | 1 |
| 350-480 | 18 | 2 | 9.0 | 0 | 1 |
| 1000+ | 12 | 2 | 7.5 | 0 | 2 |
| OPERATING SYSTEMS | | | | | |
| Software Programmable | 51 | 4 | 7.0 | 2 | 2 |
| User Programmable | 36 | 3 | 4.6 | 0 | 3 |
| STORAGE MEDIA | | | | | |
| Mag Card | 27 | 1 | 4.0 | 0 | 3 |
| Tape Cartridge | 6 | 1 | 4.0 | 0 | 1 |
| Diskette 5¼" | 0 | 1 | 4.0 | 0 | 0 |
| Diskette 8¼" | 18 | 2 | 5.0 | 0 | 1 |
| Disk | 45 | 2 | 8.0 | 1 | 1 |
| PERIPHERALS | | | | | |
| Multiple Medium Stations | 42 | 3 | 7.6 | 1 | 1 |
| Attached Work Stations 1 | 33 | 2 | 6.5 | 2 | 1 |
| 2 | 27 | 2 | 4.5 | 2 | 1 |

| | | % of Use | Interest Raters | Ave.* | Projected Implementation 1-2 yrs | 3-5 yrs** |
|---|---|---|---|---|---|---|
| Attached Work Stations | 3 | 9 | 0 | 0.0 | 1 | 0 |
| | 4 | 15 | 0 | 0.0 | 0 | 0 |
| | more | 9 | 0 | 0.0 | 0 | 0 |
| Printers | 1 | 12 | 0 | 0.0 | 0 | 0 |
| | 2 | 33 | 2 | 8.5 | 0 | 0 |
| | 3 | 9 | 0 | 0.0 | 2 | 0 |
| | 4 | 9 | 0 | 0.0 | 0 | 0 |
| | more | 15 | 0 | 0.0 | 0 | 0 |

EXHIBIT C

Characteristics of _____

Stroke Reduction Features

Automatic Center--The centering of words on a line._____
Automatic Decimal Tab--Automatic alignment of columns of decimal figures on the decimal point._____
Automatic Tab Grid--The setting up of tabs at frequent intervals, such as every five spaces._____
Automatic Indent--Carrier returns to a new indent level._____
Automatic Word Wraparound--The placement of a word which does not fit onto the line being typed onto the next line._____
Carrier Return--A return of the carrier when a certain point is reached without operator pausing to perform return._____
The ability to wrap words during margin adjust procedures._____
Document Index Generation--The identification of items within a given text that will be used to generate a document index with updated page references automatically after modification of the same document._____
Phrase Storage--The storage of certain frequently used phrases, such as "Yours truly," a return address and greetings._____

Corrections & Revisions

Block--The taking of information that has been keyboarded and saving it for when it is needed
Move Block--Moving information from one location to another_____
Copy Block--Duplicating information to move it to another location_____
Move block or copy block on same page_____
Move block or copy block across several pages_____
Character and line count--displayed when commanded_____
Dictionary--The capability to check the spelling of words against a number of frequently used or technical words._____
Formatting--Allows for the changing and defining of document parameters i.e. margin and tab settings, line spacing etc._____
Default format statement--Implemented when operator fails to designate a specific format statement_____
Stored multiple formats--The storing of more than one format and accessing the desired format on operator command._____
Forward or Backward Reference Modification--Definition of references previous to and ahead of the current page where changes are required because additional pages have been inserted/deleted before or after the current page._____
Global Search--The ability of a system to search for repeated occurrences of a string of characters.
Locates the string for operator-selected deletion or replacement_____
Automatically deletes all occurrences of a string_____
Automatically replaces all occurrences with another character string_____
Justified right margins--Forming a straight rather than uneven right margin._____
Scrolling--Allows you to see a different portion of the text than appears on the screen because the text can be rolled upward, downward, or sideways._____
Simultaneous Print--The ability to print one document while simultaneously recording new text or revising previously recorded text._____
Printout on a first-in first-out basis_____
Printout allowed on a priority basis_____

Multipage Documents

Automatic Footnote tie-in--The ability of the system to tie footnotes into appropriate text segment._____

Automatic Page Numbering--Redivision of pages on the basis of line count followed by numbering or renumbering._____

Repagination--Text will be removed from or added to pages, as required to maintain page length._____

Automatic Table of Contents Update--As pages are added/deleted to the text the table of contents is changed._____

Footnoting--Sets the bottom margin to allow space for footnoting._____

Headers and footers--Places uniform information on each page such as section numbers and title names._____

Superscripts & subscripts--The capability to place numbers slightly above or below the regular line of type where necessary._____

Statistical

Columnar Interchange--The ability to switch around whole columns of numbers automatically._____

Decimal Alignment--Lines up decimal point in columns of numbers._____

Match pack and math edits--A device that adds, subtracts, multiplies, and divides columns of figures or simply verifies the accuracy of column totals._____

Repetitive Letters

Document assembly--Stored paragraphs are assembled in any sequence desired to create a new document._____

Merging--The ability to combine stored text such as a list of names and addresses with a stored letter._____

Lists

Files--Creates lists and prints them out according to any of the categories in that list.

Updating--Adding or deleting records from one file to another_____

--Moving new fields to records within a file_____

--Adding new fields to records within a file_____

--Updating fields selectively within a record_____

Manipulating--Selecting records by combinations of criteria such as greater than, less than, equal to, at least_____

Sorting--Rearranging information in ascending or descending order_____

Other

Graphic spacing--The insertion of blocks of white space where the graphic art layout will be pasted down to complete a master for publication._____

Forms packages--Features for preparing invoices, purchase requisitions, and other types of forms._____

Edit check--A feature that prevents you from making errors when filling in a form._____

Logical Operations

Comparative Operations--The use of an "If" statement using compound conditions and operators to select or format data or letters. Example: "If Account is not "OPEN," then go to next record."_____

Control Operations--Control of the sequence of instructions preparing a letter or report. Example: Go to zip code expansion or perform zip code expansion."_____

Complex Equations--Use of equations with multiple factors to take several fields and derive a result for inclusion into a letter or report._____

File Operations--Read or writing data from one or more files in the same set of statements or machine instructions to produce a letter or report._____

Chaining Operations--The ability to execute a single instruction which will step through a number of operations to compose a set of letters or reports. Example: Select all overdue accounts, sort by county, format report, format overdue reminder letter and envelope._____

Storing on External Media

Sequential access--A method of storage on external media in which information is stored one item after another._____

Random access--A method of storage on external media in which information is stored in any desired order._____

Document History--Ability to search for documents by:

Operator identification_____

Department or author_____

Document title_____

Date and time log_____

Subject key words, i.e., Commission for Vocational Education_____

Document archives via named criteria not currently on-line in systems_____

Display

Full page_____

Partial page_____

Line_____

Dual (2 full pages miniaturized)_____

Cursor position

Moves up, down, right, left_____

Moves horizontally along a fixed line_____

Hyphenation

Manual_____

System Scan_____

Algorithm/Dictionary_____

Auto Adjust_____

Communications

Dial up to or from another word processor or computer using standard phone lines transmitting up to 20 pages/hour_____

20-50_____

50-100_____

Dedicated phone to another word processor or computer transmitting over 100 pages/hour_____

Configuration
- Keyboard/Printer
- Keyboard/Display/Printer
- Terminal/CPU/Printer

Printing

Quality required
- --single font type face/page
- --multiple font type face
- --multiple font three or more per page
- --charts and graphs
- --photocomposition for publication

Volume
- --10--50 pages/day (10-20 cps)
- --50--100 pages/day (20-40 cps)
- --100-350 pages/day (40-60 cps)
- --350-480 pages/day (ink jet)
- -1000-over (laser or intelligent)

Operating System
- Software Programmable
- User Programmable

Storage Media
- Magnetic Card
- Cassette
- Tape Cartridge
- Diskette
  - Small (5½ inch)
  - Large (8½ inch)
- Disk
- Multiple Medium Stations

Peripherals

The following relate to devices attached to a single word processing system:

Number of attached work stations--
- 1
- 2
- 3
- 4
- more

Number of printing devices:
- 1
- 2
- 3
- 4

Price
- Under $3,999
- $4,000 to $7,999
- $8,000 to $11,999
- $12,000 to $14,999
- $15,000 to $17,999
- Over $18,000

Name

Company

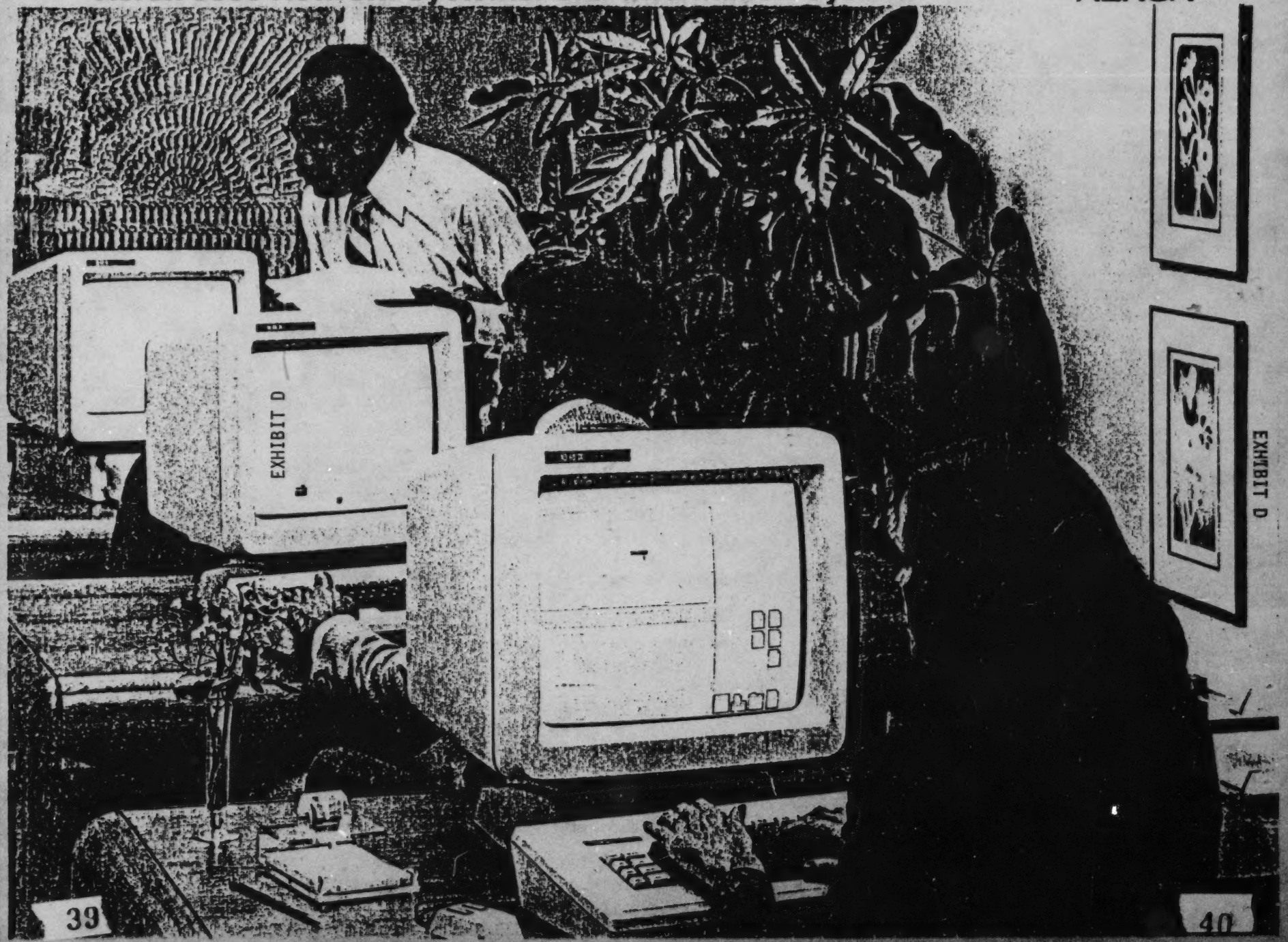
Equipment (Model)



THANK YOU

# Xerox 8000 Network Systems: Star Information System

XEROX



# Xerox 8000 Network Systems: Star Information System

XEROX

## An Information System for Business Professionals

Until now, Xerox office technology has been directed toward improving the performance and productivity of clerical personnel. The Xerox 8010 Star Information System will do the same for office professionals in business and government.

Using the new system, professionals can create, modify, store and retrieve text, graphics and records. In appearance and function, Star resembles an office workstation, but it's really many systems in one. Not only does it automate the time-consuming mechanics of developing and formatting information, it opens the door to electronic information processing, distribution and communications, allowing professionals to distribute documents by electronic mail to local and remote users of Xerox Ethernet networks.



By solving the logistics of producing lengthy documents on time, Star allows a user to concentrate on content and style rather than production deadlines.

One of the system's most attractive features is its ability to create and manipulate graphic material right on the display screen, and to integrate graphic and alpha-numeric information within the same document. Thus, it's ideal for deadline-oriented projects such as new business proposals, presentations, technical papers, training manuals and financial reports.



Star is a personal information system consisting of a Xerox 8000 NS processor, large size CRT display screen, versatile keyboard, disc files and a hand-operated pointing device called a "mouse". As the newest element in on the screen. Such time-saving features eliminate costly delays that occur when conventional artwork and text must be reformatted and remerged.

Formatting features include:
- Simplified controls
- Full page portrait or landscape composition (displayed on screen)
- Adjustable margins and tab settings
- Variable line spacing within and between paragraphs
- Automatic hyphenation, justification, orphan and widow lines, headers and footers
- Multi-column control
- Equation or illustration positioning within a page or columns

### Text Entry/Editing

With Star, Xerox incorporates advanced text entry and editing features not found in current state-of-the-art word processing systems, along with traditional features. For example: editing documents, paragraphs, sentences, words or characters. These functions are simplified by familiar commands such as delete, copy, move, find and global replace.

Other features include:
- "Modeless" operation
- Universal editing commands
- Automatic footnoting
- Automatic page numbering
- Multiple columns
- Spelling checker (optional)
- Multiple document display (up to 6)

Since the Star keyboard is not encoded, the software can interpret each key or combination of keys to extend system flexibility. Text keys may be mapped into different fonts and alphabets, including foreign language characters. Greek/math and common office symbols

## Information Handling

As part of the Xerox Ethernet network, Star provides office automation and integration through electronic information storage, printing and communications.

### Electronic Mail

A unique feature of Star is its electronic mail capabilities, which are made possible by shared network services. When connected to the Ethernet network, communications are handled by Star in- and out-basket functions.

- Incoming Mail — Incoming mail is depicted on the screen as a letter in the user's in-basket.
- Outgoing Mail — Any Star document, folder or record file can be mailed as is to any number of local and remote network users. Outgoing mail is delivered from a user's out-basket.



Electronic message forms will be another facet of Star's communicating capabilities. Special commands will provide predefined forms to aid in creating new mail, answering received mail and forwarding received mail. These actions will be accomplished automatically by commands listed in the in-basket window menu.

With the Optional Xerox 8071 Communications Server and related software, Star can communicate with some word processors and host computers not connected directly to the Ethernet network.

### Electronic Printing

Because of Star's electronic printing capabilities, any image created on the system

the Xerox Network Systems, Star comes with an internal controller and cable connector for tapping in to the Xerox Ethernet network.

For many businesses, professional salaries represent as much as 40 percent of total office costs. With the new Star System, your organization will enjoy the benefits of better time management, improved productivity, higher performance and better cost-efficiency where it really counts.

Following are some of the many outstanding features of the system which will be released on a phased basis.

## Document Preparation

### Friendly User Interface

Star introduces a revolutionary user interface based on the use of icons — pictorial representations of familiar office objects. For example, a desktop, in- and out-baskets, file folders and file drawers are literal symbols for specific functions. Each function can be performed with the aid of the mouse, the system's unique pointing device which is used to make selections and initiate actions.

User-oriented features include:

- User commands — simple and consistent from one function to another.
- Messages — allow a user to ask the system for further explanation.
- Option Sheets — enable a user to specify parameters when required for commands.
- Property Sheets — List the specific properties of a user's selection, i.e. typeface and size, line spacing, graphic attributes.
- Display Windows — portions of the screen







### Graphics Capabilities

The Star System allows a professional to develop office graphics directly on the screen, reducing dependency on outside artists and illustrators.

Basic graphic facilities include:

- Frames — Both graphics and text for graphic annotation appear on the screen within a box or "frame" which is user-created. Graphic frames may be placed within text or may incorporate text.
- Grids — Grids serve as a graphic construction aid but are never printed. Users may select gridwork in five different sizes to help create graphics within a frame. Grid spacing ensures the accurate placement of artwork.
- Shapes — Graphic shapes include squares, rectangles, triangles, circles, ovals and various arrowhead styles.
- Lines — Lines may vary in thickness and style (solid, dotted, dashed, dot-dashed, double or invisible), and may be vertical, horizontal or diagonal, and straight or curved.

Special graphic facilities enable a user to:

- Draw a line on the screen using the mouse.
- Enlarge or reduce graphics.
- Shade and texture rectangles.
- Enjoin objects in a cluster.
- Split a cluster into multiple objects.
- Activate and deactivate the grid in a selected frame.
- Maintain a library of user-defined graphic symbols.

### Tables

Users can also create tables of any size, fill them in and change them without using tabs.

can be reproduced, including various graphics, symbols and text. The system utilizes the Xerox 8044/8045 electronic printer which provides high quality, high speed printing at rates of 12 pages per minute.

Again, Star is characterized by outstanding flexibility. Pages may be printed to each user's specifications: vertically, horizontally, with multiple columns, headings, footings and footnotes.

### Electronic Filing

Star documents can be filed electronically on any File Server on the Ethernet network for convenient storage and retrieval by the same user or by authorized network users. Information can be retrieved for immediate display and/or printing. This eliminates the time-consuming manual requirements associated with conventional paper files.

In addition to centralized network storage, Star documents can be maintained on disc files at the workstation and users may grant or restrict access to private workstation files. Network storage is easily expanded with higher capacity discs or multiple File Servers, depending on user needs.

## Software Options

Xerox has developed a number of optional software programs that enhance the multifunctional aspects of Star. For example:

### Equations

With Star, a user can create complex mathematical equations in correct typeset fashion, without knowing the rules of typesetting. Equation structures follow the pattern of forms fill-in. These structures include: summation, integral, line integral, product, fraction, scripts, parenthesis, brackets, square root, matrices and multiple line equations. After each key-

which are uniform in appearance regardless of the objects they display, i.e. documents, record files, file folders, status information, alternate keyboard sets and user-selected information. Windows also enable a user to display and edit multiple documents while each is in view.

- Desktop —an electronic version of an office desktop featuring familiar office objects and tools.

### Self-Help Design

Star is highly user-oriented and requires no previous familiarity with keyboards or display screens. Basic user training can be completed in four hours or less, supplemented by 20 automated self-paced training modules which are available on-line. A "HELP" system is also available to refamiliarize users with infrequently used functions.

### Formatting

A high degree of formatting flexibility is built into Star. In fact, the system is so flexible that users can experiment with different formats and page layouts to find the one most appropriate for a particular document. Graphic or equation areas, for example, can be enlarged or reduced and text can be resized for perfect fit, directly on the screen. An accurate portrayal of the final document is always displayed



A table may be filled in by row or by column, and its total size may be fixed or may grow as additional data are added. Automatic formatting facilities permit data in tables to be centered or aligned within their fields.

### Fields

Information from a field may appear in documents, graphic frames, text frames, tables or records, and may be computed from other fields and automatically filled in by the system. Field definition and fill-in permit a user to create business forms, form letters or form memos which can be printed, mailed or filed like any Star System document.

## Information Retrieval/ Records Processing

The multi-functional Star System has the facilities to assist users in the creation and maintenance of lists, directories, records and reports. Specified fields from forms or documents can be extracted automatically and converted to records. Records of information can then be sorted, filtered and reformatted for automatic creation of reports.

With Star, a professional can access data from a host computer, organize data at the workstation, analyze data, extract pertinent information, combine data with additional text or graphics and produce a new or updated report. Such a report might also contain charts generated from tables or data received from the host computer.

stroke, the entire equation is automatically formatted.

### Spelling Checker

The Spelling Checker is a unique program which checks spelling errors automatically and enables a user to quickly locate and correct any misspellings.

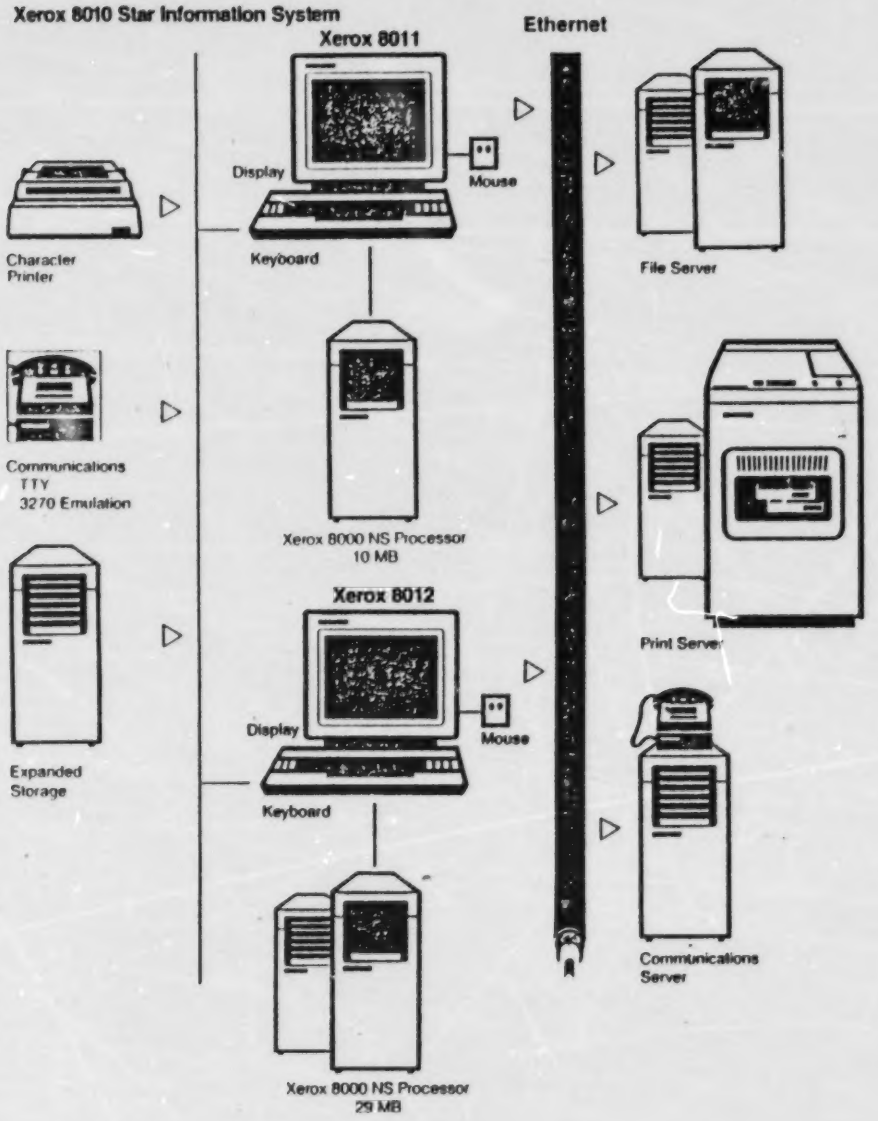
### Advanced Graphics I & II

Star's basic graphic features will be enhanced by the ability to construct automatically table-driven bar charts (I), pie charts and curve graphs (II).

### Communications

Additional communications software will enable Star to communicate with selected non-Xerox workstations and host computers not on the Xerox Ethernet network. Star can also emulate certain commonly used computer terminals.

With the multi-functional Star System, professionals can sharpen their creative thinking and improve their productivity on deadline-oriented projects. Simple to use, yet sophisticated in scope, Star incorporates advanced capabilities seldom found in a single automated system. Your Xerox Office Products Representative can show you in detail why the Xerox 8010 Star Information System is the best choice for your busy professional staff.




**Star Workstation Base System:**

- ☐ Large Format Bit Mapped Display Controlled with 1 fixed and 1 floppy disc
- ☐ 8000 NS Processor with 192K 16 bit main memory
- ☐ Keyboard with Mouse

**Software Options:**

- ☐ Advanced Graphics I & II
- ☐ Records Processing
- ☐ Spelling Checker
- ☐ Equations Formula
- ☐ Communications

**Hardware Option:**

- ☐ Character Printer — 40 cps
- ☐ Automatic Paper Feeder for 40 cps Printer

**Disc Options:**

- ☐ Rigid Disc Storage — 10 Mbytes
- ☐ Rigid Disc Storage — 29 Mbytes

**Network Servers:**

- ☐ File Server (10, 29 or 58 Mbytes)
- ☐ Print Server (10 or 29 Mbytes)
- ☐ Communications Servers

STANDALONE DISPLAY-BASED SYSTEMS EXHIBIT E

This system allows text to be keyed, edited, and changed on the display before printout. It also can perform a number of integrated functions.

| | Display-writer | Wang-writer | Xerox |
|---|---|---|---|
| **Stroke Reduction Features** | | | |
| Automatic Center--The centering of words on a line. | x | x | x |
| Automatic Decimal Tab--Automatic alignment of columns of decimal figures on the decimal point. | x | x | x |
| Automatic Tab Grid--The setting up of tabs at frequent intervals, such as every five spaces. | x | | x |
| Automatic Indent--Carrier returns to a new indent level. | x | | x |
| Automatic Word Wraparound--The placement of a word which does not fit onto the line being typed onto the next line. | x | | x |
| Carrier Return--A return of the carrier when a certain point is reached without operator pausing to perform return. | x | | x |
| The ability to wrap words during margin adjust procedures. | x | | |
| Document Index Generation--The identification of items within a given text that will be used to generate a document index with updated page references automatically after modification of the same document. | x | | |
| Phrase Storage--The storage of certain frequently used phrases, such as "Yours truly," a return address and greetings. | x | | x |
| **Corrections & Revisions** | | | |
| Block--The taking of information that has been keyboarded and saving it for when it is needed | | | |
| Move Block--Moving information from one location to another | x | | x |
| Copy Block--Duplicating information to move it to another location | x | | x |
| Move block or copy block on same page | x | | x |
| Move block or copy block across several pages | x | | x |
| Character and line count--displayed when commanded | o | | |
| Dictionary--The capability to check the spelling of words against a number of frequently used or technical words. | x | | |
| Formatting--Allows for the changing and defining of document parameters i.e. margin and tab settings, line spacing etc. | x | | x |
| Default format statement--Implemented when operator fails to designate a specific format statement | x | | x |
| Stored multiple formats--The storing of more than one format and accessing the desired format on operator command. | x | | x |
| Forward or Backward Reference Modification--Definition of references previous to and ahead of the current page where changes are required because additional pages have been inserted/deleted before or after the current page. | x | | x |
| Global Search--The ability of a system to search for repeated occurrences of a string of characters. | | | |
| Locates the string for operator-selected deletion or replacement | x | | x |
| Automatically deletes all occurrences of a string | x | | x |
| Automatically replaces all occurrences with another character string | x | | x |
| Justified right margins--Forming a straight rather than uneven right margin. | x | | x |
| Scrolling--Allows you to see a different portion of the text than appears on the screen because the text can be rolled upward, downward, or sideways. | x | | x |
| Simultaneous Print--The ability to print one document while simultaneously recording new text or revising previously recorded text. | x | | x |
| Printout on a first-in first-out basis | x* | | x |
| Printout allowed on a priority basis | x | | x |

* + priority change

STANDALONE DISPLAY-BASED SYSTEMS

| | x Display-writer | Wang-writer | Xerox 860 |
|---|---|---|---|
| **Multipage Documents** | | | |
| Automatic Footnote tie-in--The ability of the system to tie footnotes into appropriate text segment. | x | | |
| Automatic Page Numbering--Redivision of pages on the basis of line count followed by numbering or renumbering. | x | | x |
| Repagination--Text will be removed from or added to pages, as required to maintain page length. | x | | x |
| Automatic Table of Contents Update--As pages are added/deleted to the text the table of contents is changed. | x | | |
| Footnoting--Sets the bottom margin to allow space for footnoting. | x | | x |
| Headers and footers--Places uniform information on each page such as section numbers and title names. | x | | x |
| Superscripts & subscripts--The capability to place numbers slightly above or below the regular line of type where necessary. | x | | x |
| **Statistical** | | | |
| Columnar Interchange--The ability to switch around whole columns of numbers automatically. | x | | x |
| Decimal Alignment--Lines up decimal point in columns of numbers. | x | | x |
| Match pack and math edits--A device that adds, subtracts, multiplies, and divides columns of figures or simply verifies the accuracy of column totals. | x | | x |
| **Repetitive Letters** | | | |
| Document assembly--Stored paragraphs are assembled in any sequence desired to create a new document. | x | | x |
| Merging--The ability to combine stored text such as a list of names and addresses with a stored letter. | x | | x |
| **Lists** | | | |
| Files--Creates lists and prints them out according to any of the categories in that list. | | | |
| Updating--Adding or deleting records from one file to another | x | | x |
| --Moving new fields to records within a file | x | | x |
| --Adding new fields to records within a file | x | | x |
| --Updating fields selectively within a record | x | | x |
| Manipulating--Selecting records by combinations of criteria such as greater than, less than, equal to, at least | x | | x |
| Sorting--Rearranging information in ascending or descending order | x | | x |
| **Other** | | | |
| Graphic spacing--The insertion of blocks of white space where the graphic art layout will be pasted down to complete a master for publication. | x | | x |
| Forms packages--Features for preparing invoices, purchase requisitions, and other types of forms. | x | | x |
| Edit check--A feature that prevents you from making errors when filling in a form. | | | |
| **Logical Operations** | | | |
| Comparative Operations--The use of an "If" statement using compound conditions and operators to select or format data or letters. Example: "If Account is not "OPEN," then go to next record." | x | | |

| STANDALONE DISPLAY-BASED SYSTEMS | Display-writer | Wang-writer | Xerox 860 |
|---|---|---|---|
| Control Operations--Control of the sequence of instructions preparing a letter or report. Example: Go to zip code expansion or perform zip code expansion." | x | | |
| Complex Equations--Use of equations with multiple factors to take several fields and derive a result for inclusion into a letter or report. | | | |
| File Operations--Read or writing data from one or more files in the same set of statements or machine instructions to produce a letter or report. | x | | x |
| Chaining Operations--The ability to execute a single instruction which will step through a number of operations to compose a set of letters or reports. Example: Select all overdue accounts, sort by county, format report, format overdue reminder letter and envelope. | x | | x |
| Storing on External Media | | | |
| Sequential access--A method of storage on external media in which information is stored one item after another. | x | | x |
| Random access--A method of storage on external media in which information is stored in any desired order. | | | |
| Document History--Ability to search for documents by: | | | |
| Operator identification | | | |
| Department or author | | | |
| Document title | | | |
| Date and time log | | | |
| Subject key words, i.e., Commission for Vocational Education | | | |
| Document archives via named criteria not currently on-line in systems | | | |
| Display | | | |
| Full page | x | | x |
| Partial page | | | |
| Line | | | |
| Dual (2 full pages miniaturized) | | | |
| Cursor position | | | |
| Moves up, down, right, left | x | | x |
| Moves horizontally along a fixed line | x | | x |
| Hyphenation | | | |
| Manual | | | |
| System Scan | | | |
| Algorithm/Dictionary | | | |
| Auto Adjust | | | |
| Communications | | | |
| Dial up to or from another word processor or computer using standard phone lines transmitting up to 20 pages/hour | | | |
| 20-50 | | | |
| 50-100 | | | |
| Dedicated phone to another word processor or computer transmitting over 100 pages/hour | | | |

## STANDALONE DISPLAY-BASED SYSTEMS

| | Display-writer | Wang-writer | Xerox 860 |
|---|---|---|---|
| **Configuration** | | | |
| Keyboard/Printer | | | |
| Keyboard/Display/Printer | x | | x |
| Terminal/CPU/Printer | | | |
| **Printing** | | | |
| Quality required--single font type face/page | x | | x |
| --multiple font type face | | | |
| --multiple font three or more per page | | | |
| --charts and graphs | | | |
| --photocomposition for publication | | | |
| Volume --10--50 pages/day (10-20 cps) | | | |
| --50--100 pages/day (20-40 cps) | | | |
| --100-350 pages/day (40-60 cps) | x | | x |
| --350-480 pages/day (ink jet) | | | |
| -1000-over (laser or intelligent) | | | |
| **Operating System** | | | |
| Software Programmable | x | | x |
| User Programmable | | | |
| **Storage Media** | | | |
| Magnetic Card | | | |
| Cassette | | | |
| Tape Cartridge | | | |
| Diskette | x | | x |
| Small (5½ inch) | | | |
| Large (8½ inch) | x | | |
| Disk | | | |
| Multiple Medium Stations | | | x |
| **Peripherals** | | | |
| The following relate to devices attached to a single word processing system: | | | |
| Number of attached work stations--1 | | | |
| 2 | | | |
| 3 | x | | x |
| 4 | | | |
| more | | | |
| Number of printing devices: 1 | | | |
| 2 | | | |
| 3 | x | | x |
| 4 | | | |
| **Price** | | | |
| Under $3,999 | | | |
| $4,000 to $7,999 | | | |
| $8,000 to $11,999 | x | | x |
| $12,000 to $14,999 | | | |
| $15,000 to $17,999 | | | |
| Over $18,000 | | | |

Name_____

Company_____

Equipment (Model)_____

THANK YOU

SHARED-LOGIC SYSTEMS

EXHIBIT F

The system combines pieces of equipment that share the logic, storage, and peripherals of a central computer.

| | IBM 5520 | Wang | Xerox Ethernet |
|---|---|---|---|
| **Stroke Reduction Features** | | | |
| Automatic Center--The centering of words on a line. | x | x | x |
| Automatic Decimal Tab--Automatic alignment of columns of decimal figures on the decimal point. | x | x | x |
| Automatic Tab Grid--The setting up of tabs at frequent intervals, such as every five spaces. | | | |
| Automatic Indent--Carrier returns to a new indent level. | x | x | x |
| Automatic Word Wraparound--The placement of a word which does not fit onto the line being typed onto the next line. | x | x | x |
| Carrier Return--A return of the carrier when a certain point is reached without operator pausing to perform return. | x | x | x |
| The ability to wrap words during margin adjust procedures. | x | x | x |
| Document Index Generation--The identification of items within a given text that will be used to generate a document index with updated page references automatically after modification of the same document. | | | |
| Phrase Storage--The storage of certain frequently used phrases, such as "Yours truly," a return address and greetings. | x | x | x |
| **Corrections & Revisions** | | | |
| Block--The taking of information that has been keyboarded and saving it for when it is needed | | | |
| Move Block--Moving information from one location to another | x | x | x |
| Copy Block--Duplicating information to move it to another location | x | x | x |
| Move block or copy block on same page | x | x | x |
| Move block or copy block across several pages | x | x | x |
| Character and line count--displayed when commanded | x | x | x |
| Dictionary--The capability to check the spelling of words against a number of frequently used or technical words. | | | |
| Formatting--Allows for the changing and defining of document parameters i.e. margin and tab settings, line spacing etc. | x | x | x |
| Default format statement--Implemented when operator fails to designate a specific format statement | | | |
| Stored multiple formats--The storing of more than one format and accessing the desired format on operator command. | x | x | x |
| Forward or Backward Reference Modification--Definition of references previous to and ahead of the current page where changes are required because additional pages have been inserted/deleted before or after the current page. | x | | |
| Global Search--The ability of a system to search for repeated occurrences of a string of characters. | | | |
| Locates the string for operator-selected deletion or replacement | x | x | x |
| Automatically deletes all occurrences of a string | x | x | x |
| Automatically replaces all occurrences with another character string | x | x | x |
| Justified right margins--Forming a straight rather than uneven right margin. | x | x | x |
| Scrolling--Allows you to see a different portion of the text than appears on the screen because the text can be rolled upward, downward, or sideways. | x | x | x |
| Simultaneous Print--The ability to print one document while simultaneously recording new text or revising previously recorded text. | x | x | x |
| Printout on a first-in first-out basis | x | x | x |
| Printout allowed on a priority basis | x | x | x |

| | IBM 5120 | Wang | Xerox Ethernet |
|---|---|---|---|
| **Multipage Documents** | | | |
| Automatic Footnote tie-in--The ability of the system to tie footnotes into appropriate text segment. | | | |
| Automatic Page Numbering--Redivision of pages on the basis of line count followed by numbering or renumbering. | x | x | x |
| Repagination--Text will be removed from or added to pages, as required to maintain page length. | x | x | x |
| Automatic Table of Contents Update--As pages are added/deleted to the text the table of contents is changed. | | x | |
| Footnoting--Sets the bottom margin to allow space for footnoting. | x | x | x |
| Headers and footers--Places uniform information on each page such as section numbers and title names. | x | x | x |
| Superscripts & subscripts--The capability to place numbers slightly above or below the regular line of type where necessary. | x | x | x |
| **Statistical** | | | |
| Columnar Interchange--The ability to switch around whole columns of numbers automatically. | | x | |
| Decimal Alignment--Lines up decimal point in columns of numbers. | x | x | x |
| Match pack and math edits--A device that adds, subtracts, multiplies, and divides columns of figures or simply verifies the accuracy of column totals. | | x | x |
| **Repetitive Letters** | | | |
| Document assembly--Stored paragraphs are assembled in any sequence desired to create a new document. | x | x | x |
| Merging--The ability to combine stored text such as a list of names and addresses with a stored letter. | x | x | x |
| **Lists** | | | |
| Files--Creates lists and prints them out according to any of the categories in that list. | | | |
| Updating--Adding or deleting records from one file to another | | x | x |
| --Moving new fields to records within a file | | x | x |
| --Adding new fields to records within a file | | x | x |
| --Updating fields selectively within a record | | x | x |
| Manipulating--Selecting records by combinations of criteria such as greater than, less than, equal to, at least | | x | x |
| Sorting--Rearranging information in ascending or descending order | x | x | x |
| **Other** | | | |
| Graphic spacing--The insertion of blocks of white space where the graphic art layout will be pasted down to complete a master for publication. | x | x | x |
| Forms packages--Features for preparing invoices, purchase requisitions, and other types of forms. | | x | x |
| Edit check--A feature that prevents you from making errors when filling in a form. | | x | |
| **Logical Operations** | | | |
| Comparative Operations--The use of an "If" statement using compound conditions and operators to select or format data or letters. Example: "If Account is not "OPEN," then go to next record." | | x | |

| SHARED-LOGIC SYSTEMS | IBM 5120 | Wang | Xerox Ethernet |
|---|---|---|---|
| Control Operations--Control of the sequence of instructions preparing a letter or report. Example: Go to zip code expansion or perform zip code expansion." | | x | x |
| Complex Equations--Use of equations with multiple factors to take several fields and derive a result for inclusion into a letter or report. | | x | |
| File Operations--Read or writing data from one or more files in the same set of statements or machine instructions to produce a letter or report. | x | x | x |
| Chaining Operations--The ability to execute a single instruction which will step through a number of operations to compose a set of letters or reports. Example: Select all overdue accounts, sort by county, format report, format overdue reminder letter and envelope. | | x | x |
| Storing on External Media | | | |
| Sequential access--A method of storage on external media in which information is stored one item after another. | x | x | x |
| Random access--A method of storage on external media in which information is stored in any desired order. | | x | |
| Document History--Ability to search for documents by: | | | |
| Operator identification | x | x | x |
| Department or author | x | x | x |
| Document title | | x | |
| Date and time log | | x | x |
| Subject key words, i.e., Commission for Vocational Education | | x | |
| Document archives via named criteria not currently on-line in systems | x | x | x |
| Display | | | |
| Full page | | | x |
| Partial page | x | x | x |
| Line | x | x | x |
| Dual (2 full pages miniaturized) | | | x |
| Cursor position | | | |
| Moves up, down, right, left | x | x | x |
| Moves horizontally along a fixed line | x | x | x |
| Hyphenation | | | |
| Manual | x | x | x |
| System Scan | | | |
| Algorithm/Dictionary | | | |
| Auto Adjust | x | x | x |
| Communications | | | |
| Dial up to or from another word processor or computer using standard phone lines transmitting up to 20 pages/hour | x | x | x |
| 20-50 | x | x | x |
| 50-100 | x | x | x |
| Dedicated phone to another word processor or computer transmitting over 100 pages/hour | x | x | x |

SHARED-LOGIC SYSTEMS

| | IBM 5120 | Wang | Xerox Ethernet |
|---|---|---|---|
| **Configuration** | | | |
| Keyboard/Printer | | | |
| Keyboard/Display/Printer | x | x | x |
| Terminal/CPU/Printer | x | x | x |
| **Printing** | | | |
| Quality required--single font type face/page | x | x | x |
| --multiple font type face | x | x | x |
| --multiple font three or more per page | x | x | x |
| --charts and graphs | | | |
| --photocomposition for publication | x | x | x |
| Volume --10--50 pages/day (10-20 cps) | x | x | x |
| --50--100 pages/day (20-40 cps) | x | x | x |
| --100-350 pages/day (40-60 cps) | x | x | x |
| --350-480 pages/day (ink jet) | x | x | x |
| -1000-over (laser or intelligent) | x | x | x |
| **Operating System** | | | |
| Software Programmable | | x | x |
| User Programmable | | x | |
| **Storage Media** | | | |
| Magnetic Card | | | |
| Cassette | | | |
| Tape Cartridge | | | |
| Diskette | | | |
| Small (5½ inch) | | | |
| Large (8½ inch) | x | x | x |
| Disk | x | x | x |
| Multiple Medium Stations | x | x | x |
| **Peripherals** | | | |
| The following relate to devices attached to a single word processing system: | | | |
| Number of attached work stations--1 | x | x | x |
| 2 | x | x | x |
| 3 | x | x | x |
| 4 | x | x | x |
| more | x | x | x |
| Number of printing devices: 1 | x | x | x |
| 2 | x | x | x |
| 3 | | | x |
| 4 | | | x |
| **Price** | | | |
| Under $3,999 | | | |
| $4,000 to $7,999 | | | |
| $8,000 to $11,999 | | | |
| $12,000 to $14,999 | | | |
| $15,000 to $17,999 | | | |
| Over $18,000 | x | x | x |

Name_____

Company_____

Equipment (Model)_____



THANK YOU

Characteristics of

| | IBM 8100 | Wang VS-100 | Prime 750 |
|---|---|---|---|
| **Stroke Reduction Features** | | | |
| Automatic Center--The centering of words on a line. | x | | x |
| Automatic Decimal Tab--Automatic alignment of columns of decimal figures on the decimal point. | | | |
| Automatic Tab Grid--The setting up of tabs at frequent intervals, such as every five spaces. | x | | x |
| Automatic Indent--Carrier returns to a new indent level. | x | | x |
| Automatic Word Wraparound--The placement of a word which does not fit onto the line being typed onto the next line. | x | | x |
| Carrier Return--A return of the carrier when a certain point is reached without operator pausing to perform return. | x | | x |
| The ability to wrap words during margin adjust procedures. | | | |
| Document Index Generation--The identification of items within a given text that will be used to generate a document index with updated page references automatically after modification of the same document. | | | x |
| Phrase Storage--The storage of certain frequently used phrases, such as "Yours truly," a return address and greetings. | x | | x |
| **Corrections & Revisions** | | | |
| Block--The taking of information that has been keyboarded and saving it for when it is needed | | | |
| Move Block--Moving information from one location to another | x | | x |
| Copy Block--Duplicating information to move it to another location | x | | x |
| Move block or copy block on same page | x | | x |
| Move block or copy block across several pages | x | | x |
| Character and line count--displayed when commanded | x | | x |
| Dictionary--The capability to check the spelling of words against a number of frequently used or technical words. | | | x |
| Formatting--Allows for the changing and defining of document parameters i.e. margin and tab settings, line spacing etc. | x | | x |
| Default format statement--Implemented when operator fails to designate a specific format statement | x | | x |
| Stored multiple formats--The storing of more than one format and accessing the desired format on operator command. | x | | x |
| Forward or Backward Reference Modification--Definition of references previous to and ahead of the current page where changes are required because additional pages have been inserted/deleted before or after the current page. | | | |
| Global Search--The ability of a system to search for repeated occurrences of a string of characters. | | | |
| Locates the string for operator-selected deletion or replacement | | | x |
| Automatically deletes all occurrences of a string | | | x |
| Automatically replaces all occurrences with another character string | | | x |
| Justified right margins--Forming a straight rather than uneven right margin. | x | | x |
| Scrolling--Allows you to see a different portion of the text than appears on the screen because the text can be rolled upward, downward, or sideways. | x | | x |
| Simultaneous Print--The ability to print one document while simultaneously recording new text or revising previously recorded text. | x | | x |
| Printout on a first-in first-out basis | x | | x |
| Printout allowed on a priority basis | x | | x |

| | IBM 8100 | Wang VS-100 | Prime 750 |
|---|---|---|---|
| **Multipage Documents** | | | |
| Automatic Footnote tie-in--The ability of the system to tie footnotes into appropriate text segment. | | | |
| Automatic Page Numbering--Redivision of pages on the basis of line count followed by numbering or renumbering. | x | | x |
| Repagination--Text will be removed from or added to pages, as required to maintain page length. | x | | x |
| Automatic Table of Contents Update--As pages are added/deleted to the text the table of contents is changed. | | | x |
| Footnoting--Sets the bottom margin to allow space for footnoting. | x | | x |
| Headers and footers--Places uniform information on each page such as section numbers and title names. | x | | x |
| Superscripts & subscripts--The capability to place numbers slightly above or below the regular line of type where necessary. | | | |
| **Statistical** | | | |
| Columnar Interchange--The ability to switch around whole columns of numbers automatically. | | | |
| Decimal Alignment--Lines up decimal point in columns of numbers. | | | |
| Match pack and math edits--A device that adds, subtracts, multiplies, and divides columns of figures or simply verifies the accuracy of column totals. | | | |
| **Repetitive Letters** | | | |
| Document assembly--Stored paragraphs are assembled in any sequence desired to create a new document. | x | | x |
| Merging--The ability to combine stored text such as a list of names and addresses with a stored letter. | x | | x |
| **Lists** | | | |
| Files--Creates lists and prints them out according to any of the categories in that list. | | | |
| Updating--Adding or deleting records from one file to another | x | | x |
| --Moving new fields to records within a file | x | | x |
| --Adding new fields to records within a file | x | | x |
| --Updating fields selectively within a record | x | | x |
| Manipulating--Selecting records by combinations of criteria such as greater than, less than, equal to, at least | | | |
| Sorting--Rearranging information in ascending or descending order | | | |
| **Other** | | | |
| Graphic spacing--The insertion of blocks of white space where the graphic art layout will be pasted down to complete a master for publication. | x | | x |
| Forms packages--Features for preparing invoices, purchase requisitions, and other types of forms. | x | | x |
| Edit check--A feature that prevents you from making errors when filling in a form. | x | | |
| **Logical Operations** | | | |
| Comparative Operations--The use of an "If" statement using compound conditions and operators to select or format data or letters. Example: "If Account is not "OPEN," then go to next record." | | | |

| | IBM 8100 | Wang VS-100 | Prime 750 |
|---|---|---|---|
| Control Operations--Control of the sequence of instructions preparing a letter or report. Example: Go to zip code expansion or perform zip code expansion." | | | |
| Complex Equations--Use of equations with multiple factors to take several fields and derive a result for inclusion into a letter or report. | | | |
| File Operations--Read or writing data from one or more files in the same set of statements or machine instructions to produce a letter or report. | x | | x |
| Chaining Operations--The ability to execute a single instruction which will step through a number of operations to compose a set of letters or reports. Example: Select all overdue accounts, sort by county, format report, format overdue reminder letter and envelope. | x | | |
| Storing on External Media | | | |
| Sequential access--A method of storage on external media in which information is stored one item after another. | x | | x |
| Random access--A method of storage on external media in which information is stored in any desired order. | x | | x |
| Document History--Ability to search for documents by: | | | |
| Operator identification | x | | x |
| Department or author | x | | x |
| Document title | x | | x |
| Date and time log | x | | x |
| Subject key words, i.e., Commission for Vocational Education | x | | x |
| Document archives via named criteria not currently on-line in systems | x | | x |
| Display | | | |
| Full page | | | |
| Partial page | x | | x |
| Line | | | |
| Dual (2 full pages miniaturized) | | | |
| Cursor position | | | |
| Moves up, down, right, left | x | | x |
| Moves horizontally along a fixed line | x | | x |
| Hyphenation | | | |
| Manual | x | | x |
| System Scan | x | | |
| Algorithm/Dictionary | | | x |
| Auto Adjust | x | | |
| Communications | | | |
| Dial up to or from another word processor or computer using standard phone lines transmitting up to 20 pages/hour | x | | x |
| 20-50 | x | | x |
| 50-100 | x | | x |
| Dedicated phone to another word processor or computer transmitting over 100 pages/hour | x | | x |

| | IBM 8100 | Wang VS-100 | Prime 750 |
|---|---|---|---|
| **Configuration** | | | |
| Keyboard/Printer | | | |
| Keyboard/Display/Printer | x | | x |
| Terminal/CPU/Printer | | | |
| **Printing** | | | |
| Quality required--single font type face/page | x | | x |
| --multiple font type face | x | | x |
| --multiple font three or more per page | x | | |
| --charts and graphs | | | |
| --photocomposition for publication | | | |
| Volume --10--50 pages/day (10-20 cps) | x | | x |
| --50--100 pages/day (20-40 cps) | x | | x |
| --100-350 pages/day (40-60 cps) | x | | x |
| --350-480 pages/day (ink jet) | x | | x |
| -1000-over (laser or intelligent) | x | | |
| **Operating System** | | | |
| Software Programmable | x | | |
| User Programmable | x | | |
| **Storage Media** | | | |
| Magnetic Card | | | |
| Cassette | | | |
| Tape Cartridge | | | |
| Diskette | | | |
| Small (5½ inch) | | | |
| Large (8½ inch) | x | | |
| Disk | x | | |
| Multiple Medium Stations | x | | |
| **Peripherals** | | | |
| The following relate to devices attached to a single word processing system: | | | |
| Number of attached work stations--1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| more | x | | x |
| Number of printing devices: 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | x | | x |
| **Price** | | | |
| Under $3,999 | | | |
| $4,000 to $7,999 | | | |
| $8,000 to $11,999 | | | |
| $12,000 to $14,999 | | | |
| $15,000 to $17,999 | | | |
| Over $18,000 | x | | x |

Name_____

Company_____

Equipment (Model)_____

THANK YOU

APPENDIX 2--Job Classifications


| | | |
|---|---|---|
| Exhibit H | State Classifications . . . . . | 52 |
| Exhibit I | International Word Processing Association . . | 62 |
| Exhibit J | Skills and Abilities . . . . . | 64 |
| Exhibit K | Senior Word Processing Specialist . . . . . | 66 |

EXHIBIT H

WASHINGTON STATE DEPARTMENT OF PERSONNEL 0122

Specification for Class of

WORD PROCESSING OPERATOR I

Definition: Performs routine keyboarding on word processing equipment where the material recorded requires little modification.

Distinguishing Characteristics: This class is the entry level for the class series. Material recorded is relatively simple, but will become progressively more difficult as knowledge of the equipment and formats are obtained. Word Processing Operator 1's work with such material as labels, envelopes, mailing lists, short reports (1-5 pages), simple form letters and simple transcription.

Incumbents will receive technical training in word processing.

Knowledge and Abilities

Knowledge of: office practices; business English, spelling, and concepts of operating tape or disc controlled word processing equipment.

Ability to: type rapidly and accurately; apply clerical procedures; understand and follow directions.

Minimum Qualifications

Graduation from high school or GED equivalency and one year of typing and clerical experience.

OR

Successful completion of a word processing course. An approved word processing course includes typing experience on word processing equipment, dictation, transcription and English usage.

OR

One year of college or business school training in related field. A related field shall mean college or business training in secretarial science or word processing.

New class
Effective July 1, 1972
Revised September 7, 1973
Revises definition and distinguishing characteristics
Revised June 25, 1976
Revises minimum qualifications
Revised September 12, 1980
Revises title (formerly Power Keyboard Operator 1), definition, distinguishing characteristics and minimum qualifications

Specification for Class of

WORD PROCESSING OPERATOR 2

Definition: Performs and takes responsibility for the keyboarding of complex material on word processing equipment.

Distinguishing Characteristics: This is the journey level for the Word Processing Operator series. Work involves setting up pre-established formats on word processing equipment such as additions or deletions to previously standardized material, transferring data from one media to another, filing media and instructions for future use in word processing systems and setting up documents that involve making decisions in coding, modifying, or correcting of data on word processing equipment.

Material most Word Processing Operator 2's work with includes:

Long reports (over 5 pages) and letters of a general nature.

Reports and letters that contain medical, legal, or business terminology, and complex charts and graphs.

Transcriptions of letters, reports, hearings, workshops, etc.

Letters with multiple changes to each letter.

Form letters containing more than four variables.

Contracts (memorandums of agreement, personal service contracts).

Knowledge and Abilities

Knowledge of: office practices and procedures; business English; simple arithmetic; spelling; vocabulary; concepts and principles of operating disc or tape controlled automated word processing equipment.

Ability to: type rapidly and accurately; apply clerical procedures; understand and follow directions; proofread smooth and rough copy.

Minimum Qualifications

One year as a Word Processing Operator 1 or comparable.

Comparable work processing experience is defined as experience operating word processing equipment. Acceptable word processing equipment is defined as word processing machines as stated on the word processing equipment list. In addition, one must have performed duties that are typified by those in the Word Processing Operator 1 specification.

New class
Effective May 1, 1968
Revised May 1, 1969
Revises minimum qualifications
Revised July 1, 1972
General revision
Revised September 7, 1973
Revises definition, distinguishing characteristics and minimum qualifications
Revised September 12, 1980
Revises definition, distinguishing characteristics, title (formerly Power Keyboard Operator 2) and minimum qualifications
Revised April 10, 1981
Revises minimum qualifications

Specification for Class of

# WORD PROCESSING SPECIALIST

Definition: Schedules, organizes and performs assigned keyboarding of complex material on word processing equipment exercising specialized, technical knowledge of the equipment and operating procedures or acts as an assistant supervisor of a word processing center or in a small field unit functions as the supervisor of two or more operators.

Distinguishing Characteristics: Incumbents are expected to develop and program complex formats, develop and maintain procedures or process work such as legal, statistical, WACs, etc. Positions allocated to this class may provide technical guidance and assistance to other operators in a Word Processing Center and/or assistance to the supervisor.

Word Processing Specialist positions are characterized by independence of action, proofreading other operator's work, the complete use of the filing capacity of a word processing machine, the design of forms, the complete revision and/or design of formats where no existing formats exist, and direct contact with users.

## Knowledge and Abilities

Knowledge of: office practices, systems and procedures; business English; simple arithmetic; spelling and grammar; principles of operating tape controlled automatic typing equipment; concepts of coding for compatible equipment; basic supervisory practices.

Ability to: type rapidly and accurately; apply clerical procedures; understand and follow directions; learn new methods; maintain effective working relationships; proofread and edit smooth and rough copy.

## Minimum Qualifications

One year as a Word Processing Operator 2 or comparable.

Comparable word processing experience is defined as experience operating word processing equipment. Acceptable word processing equipment is defined as word processing machines as stated on the word processing equipment list. In addition, one must have performed duties that are typified by those in the Word Processing Operator 2 specification.

New class
Effective July 1, 1972
Revised September 7, 1973
Revises definition, distinguishing characteristics and minimum qualifications
Revised September 12, 1980
Revises title (formerly Power Keyboard Operator 3), definition, distinguishing characteristics and minimum qualifications
Revised April 10, 1981
Revises minimum qualifications

WASHINGTON STATE DEPARTMENT OF PERSONNEL 0343

Specification for Class of

DATA ENTRY OPERATOR I

Definition: Performs only basic data inquiry and entry functions under close supervision.

Typical Work

Operates data entry equipment in recording and verifying basic social, financial, statistical and other coded data into machine readable format;

Transmits messages, reports, and other records of data for later transmission or by direct line to a computer through operation of data entry equipment;

Performs simple, repetitive changes of permanent records stored in the computer;

Receives instruction and memorizes data entry procedures and codes;

Files and recovers technical material, identifying subject or system code; sets up new subject code numbers within established system; determines and files cross-references as needed;

Maintains satisfactory production and error percentage levels;

Performs other work as required.

Knowledge and Abilities

Knowledge of: data entry operations and capabilities; general clerical practices; theory of direct access and input of data into computers.

Ability to: enter alpha and numeric materials and data rapidly and accurately; understand and carry out oral and written instructions; perform routine clerical tasks requiring limited exercise of judgment; learn methods and procedures.

Minimum Qualifications

1. Graduation from high school or GED equivalent.

AND

2. One year of clerical and typing experience.

OR

Completion of 72 hours of coursework in data entry operation.

NOTE: Selective certification for candidates with specific experience background may be authorized to meet the requirements of certain positions.

After one year in grade if employee successfully passes exam, both employee and position are upgraded to Data Entry Operator II.

New class (Replaces Key Punch Operator I and Remote Terminal Typist I)
Effective July 1, 1976

WASHINGTON STATE DEPARTMENT OF PERSONNEL 0344

Specification for Class of

DATA ENTRY OPERATOR II

Definition: Performs complex data inquiry and entry functions under minimal supervision and transcribes and/or verifies complex data into machine readable format; edits documents, returning them for corrections or completeness where necessary.

Typical Work

Operates data entry equipment in recording and verifying complex social, financial, statistical and other coded data into machine readable format;

Transmits data, creating or changing permanent records, directly into computer via a remote terminal keyboard;

Verifies the accuracy and completion of documents, returning them for correction or completion where necessary;

Performs most complex inquiry and/or correction work utilizing data entry equipment;

May operate in and be responsible for an area geographically separated from Olympia;

In field operations or those involving public contact derives information, recalls requested data, and enters new records;

Codes source documents to be processed;

Acts as lead worker in smaller data entry units;

Assists in training new data entry operators in data entry procedures in smaller data entry installations;

Performs other work as required.

Knowledge and Abilities

Knowledge of: data entry procedures and equipment; theory and practices of general clerical procedures; theory and practice of data entry operations; theory of the interrelation of the data entry equipment and third generation electronic data processing equipment.

Ability to: enter alpha and numeric material rapidly and accurately; operate data entry equipment; code source documents; maintain production criteria established by department; understand and carry out oral and written instructions; perform clerical tasks.

Minimum Qualifications:

1. High school graduation or GED equivalent.

AND

2. One year of experience in data entry operations.

Additional qualifying experience may be substituted, year for year, for education.

NOTE: Selective certification for candidates with specific experience background may be authorized to meet the requirements of certain positions.

New class (replaces Key Punch Operator II and Remote Terminal Typist II)
Effective July 1, 1976

WASHINGTON STATE DEPARTMENT OF PERSONNEL 0345

Specification of Class of

DATA ENTRY OPERATOR III

Definition: Serves as lead operator and assistant supervisor for data entry operators for a major shift; may supervise a secondary shift in a smaller data entry unit.

Distinguishing Characteristics: Positions allocated to this class have responsibility for training and supervising at least five (5) data entry operators.

Typical Work

Acts as lead operator and assists in the training of new operators in the correct use of data entry equipment;

Plans, assigns workload and supervises subordinate staff engaged in data entry operations in a smaller data entry unit;

Assists with or maintains punch card or tape files; attendance and production records, and procedures manuals;

Checks work in progress and recommends improvements to be incorporated;

Operates data entry equipment in recording and verifying complex social, financial, statistical and other coded data into machine readable format;

Serves as assistant to the supervisor of a major shift;

Verifies data entry work for accuracy and completeness returning inaccurate or incomplete work;

Assists Data Entry Operators in the resolution of complex operational problems and assigned tasks;

Assists with selection, interviewing and evaluating of employees;

Performs other duties as required.

Knowledge and Abilities

Knowledge of: theory and use of data entry equipment and methods; clerical practices and procedures.

Ability to: plan , assign, train, supervise and evaluate work of others; operate data entry equipment; enter alpha and numeric material rapidly and accurately; understand, explain and carry out oral and written instructions.

Minimum Qualifications:

1. Graduation from high school or GED equivalent.

AND

2. Two years of experience in data entry operations.

NOTE: Selective certification for candidates with specific experience background may be authorized to meet the requirements of certain positions.

New Class (Replaces Key Punch Assistant Supervisor and Remote Terminal Typist III)
Effective July 1, 1976

Specification for Class of

# PROGRAMMER 1

Definition: Under direct supervision, prepares programs and operational routines for routine problems, or clearly defined segments of more complex programs.

## Typical Work

Prepares program flow charts and diagrams and devises coding required for programming logic;

Modifies or revises routine programs or specific portions of larger programs;

Develops cross-checks and other types of testing media for tracing various machine phases and determining adequacy of new or modified programs;

Analyzes test results to detect technical programming errors or reasons for malfunctions;

Operates computers and other equipment to test programs;

Performs other work as required.

## Knowledge and Abilities

Knowledge of: electronic data processing techniques and procedures.

Ability to: write procedures and instructions in clear, logical sequence; analyze complex problems and describe their solutions graphically; prepare clear, concise reports.

## Minimum Qualifications

Two years' accredited college or university schooling toward a Computer Science degree including completion of course work in at least one application program language.

OR

Completion of an accredited vocational training or community college program in electronic data processing.

OR

One year as a Programmer Trainee in Washington State Service.

OR

Completion of one year Programmer Entry Program (PEP) as offered through the Washington State Department of Personnel Division of Human Resource Development.

OR

One year of programming experience.

New class
Effective March 1, 1967
Revised July 1, 1967
Revises minimum qualifications
Revised May 11, 1979
Revises minimum qualifications
Revised November 9, 1979
Revises minimum qualifications

WASHINGTON STATE DEPARTMENT OF PERSONNEL 0352

Specification for Class of

PROGRAMMER 2

Definition: Prepares varied programs and operational routines for conversion of accounting and statistical problems to electronic data processing.

Typical Work

Plans, designs, and develops programming procedures and instructions for converting problems to logical sequence of machine operation;

Establishes coding procedures and programming standards; edits machine detail;

Analyzes, modifies, and revises established programs to meet agency requirements;

Develops and applies cross-checks and other types of testing media for tracing various computer phases;

Analyzes test results to detect technical programming errors and to isolate factors causing abnormal machine behavior or malfunction;

Verifies validity of new or modified programs;

Instructs and advises beginning level programmers;

Codes less complex EDP systems according to the requirements of the Computer Systems Analyst;

Performs other work as required.

Knowledge and Abilities

Knowledge of: electronic computer application and operation; programming procedures, techniques, and codes.

Ability to: write procedures and instructions in clear, logical sequence; analyze complex problems and describe their solutions graphically; prepare clear, concise reports.

Minimum Qualifications

A Bachelor's degree in computer science.

OR

A Bachelor's degree involving major study in business administration, accounting, statistics, mathematics, or closely allied field; and completion of course work in at least one application program language.

OR

Completion of an accredited vocational training or community college program in electronic data processing; and one year of programming experience.

OR

Two years of programming training and experience with at least one year of experience at the Programmer 1 or equivalent level.

New class
Effective March 1, 1967
Revised November 9, 1979
Revises minimum qualifications

WASHINGTON STATE DEPARTMENT OF PERSONNEL 0358

Specification for Class of

# COMPUTER SYSTEMS ANALYST 1

Definition: Performs a variety of basic assignments relative to designing, developing, programming, implementing and maintaining data processing systems.

Distinguishing Characteristics: Positions allocated to this class perform at the entry level in computer systems analysis and programming, preparing for advancement in either the Programmer or Computer Systems Analyst series.

Typical Work

Designs detailed record and form layouts;

Assists in preparing machine logic and systems flow charts;

Prepares program flow charts and diagrams and devises coding required for processing accounting and statistical data;

Analyzes and evaluates existing procedures and proposed changes in operations;

Modifies or revises routine programs or specific portions of larger programs;

Assists in determining types of manual, communications, punched card or electronic equipment best suited to each phase of a data processing system;

Analyzes test results to detect technical programming errors or reasons for malfunctions;

Assists higher level analysts in conducting major studies of accounting, statistical or reporting systems within the department;

Writes operating procedures for use of computer operators, tape librarians and peripheral equipment operators in execution of programs;

Performs other work as required.

Minimum Qualifications

A Bachelor's degree in computer science, business administration, mathematics, engineering or closely allied field, including a minimum of six semester or nine quarter hours or equivalent in computer science.

Note: For selected positions only, experience in systems analysis or programming may be substituted, year for year, for education; or an Associate of Arts degree in data processing technology plus two years of electronic data processing experience may be substituted for the Bachelor's degree.

New class
Effective March 1, 1967
Revised May 21, 1973
General revision
Revised April 14, 1978
Revises definition, distinguishing characteristics and minimum qualifications

Specification for Class of

# COMPUTER SYSTEMS ANALYST II

Definition: Develops a variety of procedures to process information employing electronic data processing equipment; determines computer systems specifications and record layouts; studies and recommends implementation of advanced procedural methods.

Distinguishing Characteristics: Positions allocated to this class are assigned work by an employee of higher classification who provides assistance during the course of studies and reviews completed work for the adequacy of the principles and techniques of systems analysis.

Typical Work

Confers with departmental personnel to determine problem areas and types of data to be processed;

Analyzes problems relative to systems requirements;

Modifies systems designed to achieve maximum utilization of existing data processing equipment;

Recommends changes or additions to equipment configurations to facilitate efficient and effective systems application;

Prepares detailed program problem definitions for solution by EDP programmers;

Advises on implementation of systems applications;

Determines standards for systems analysis and programming procedures;

Assists in conducting major feasibility studies regarding probable areas of systems application;

Performs other work as required.

Minimum Qualifications

A Bachelor's degree in computer science, business administration, mathematics, engineering or closely allied field, plus one year of experience in computer programming or computer systems analysis.

OR

Completion of a two year vocational training course in electronic data processing, plus three years of experience in computer programming or computer systems analysis.

A Master's degree in a field mentioned above may be substituted for one year of experience.

Additional experience in electronic data processing may be substituted, year for year, for education.

New class
Effective March 1, 1967



Revised November 1, 1969
Revises minimum qualifications



Revised May 21, 1973
General Revision

EXHIBIT I

INTERNATIONAL WORD PROCESSING ASSOCIATION

Recommended Job Classifications

Director of Information Support Systems--Has total responsibility for organization's office system, including word processing, administrative support, and other information processing.

Administrative Support Manager. Responsible for developing, maintaining, and evaluating all service sturctures under administrative support within an organization, such as filing, records and retention, reprographics, telephone, mail, etc.

Staff Analyst. Responsible for consulting and assisting word processing and administrative support supervisors and managers. Conducts studies, reviews operations, and determines and recommends appropriate staffing, procedures, and equipment.

Administrative Support Supervisor. Responsible for liaison with and training of users who benefit from administrative support. Evaluates staffing requirements, and prepares management reports.

Senior Administrative Secretary. Composes and edits documents for principals, provides research support, handles special projects, and performs other paraprofessional duties.

Administrative Secretary. Responsible for such support functions as filing, photocopying, maintaining calendars, records, and lists.

Word Processing Manager. Responsible for the overall operation of a word processing center, including personnel administration, staff requirements, user liaison and evaluation, design and implementation of future word processing systems, budgets, overall production reports, and coordination of services with administrative support.

Word Processing Supervisor. Responsible for the operation of a center (or section within a large center). Schedules and coordinates work flow and assists word processing personnel in document production and in establishing and maintaining quality standards, analyzes production data and procedures, identifies potential improvements, prepares information for budgets and recommends equipment choices.

Proofreader. Proofreads typed copy for text content, spelling, punctuation, grammar, and typographical errors. May be responsible for setting grammar and format standards.

Word Processing Trainer. Trains new operators, instructs users in dictation methods and other procedures to insure maximum utilization of a word processing center. Recommends equipment in terms of ease of use.

Phototypesetting Specialist. Enters special codes while keyboarding and revising text for output on a photocomposition system.

Word Processing Specialist II/Assistant Supervisor. Operates all information processing functions, coordinates and assigns work, analyzes requirements for specific projects, communicates with users, compiles production statistics, recommends changes in center procedures, assists in training personnel, acts as assistant supervisor.

Word Processing Specialist I. Formats, produces, and revises complicated lengthy technical documents and statistical reports from complex source information, including the retrieval of text and data from electronic files. Exercises independent action when interpreting instructions to produce a quality document, understands proofreader marks, and assumes full responsibility for document accuracy and completeness. Has a thorough knowledge of center procedures and maintenance of records. May operate word processing equipment in the telecommunications mode.

Word Processing Operator. In addition to the word processing trainee qualilfications, handles special documents, meets established quality standards, uses text editing functions, and is familiar with department terminology and company practices.

Word Processing Trainee. Possesses adequate typing skills, good knowledge of grammar, punctuation, spelling and formatting; uses reference materials; practices teamwork; performs routine transcription and manipulation of text from various types of source information; maintains own production records and may be required to proofread own work.

EXHIBIT J

WASHINGTON STATE DEPARTMENT OF PERSONNEL
SPECIFICATIONS FOR WORD PROCESSING JOB CLASSIFICATIONS

| SKILLS/ ABILITIES | WP I | WP II | WP Spec | WP Supv | WP Sec Sup C | WP Mgr |
|---|---|---|---|---|---|---|
| Office Procedures | X | X | X | | | |
| Application of clerical procedures | X | X | X | | | |
| Secretarial Sciences | | | | X | X | |
| Spelling | X | X | X | | X | |
| Simple Arithmetic | X | X | X | | X | |
| Vocabulary | | X | | X | X | |
| Business English | X | X | X | X | X | |
| Business Communication | | | | X | X | |
| Storage Media | | | | | | |
| Typing Accuracy | X | X | | | | |
| Typing Speed | X | X | | | | |
| Understand Directions | X | X | X | | | |
| Follow Directions | X | X | X | | | |
| Experience on WP Equipment | | | | | | |
| Dictation | X | X | | | | |
| Transcription | X | X | | | | |
| Equipment Knowledge | X | X | | | | |
| Concepts and principles of operating disc or tape controlled automated WP equipment | X | X | | | | |
| Formatting Knowledge | X | X | | | | |
| Proofread Smooth/Rough Copy | | X | X | | | |
| Editing | | | X | | | |
| Ability to Correct/Revise | | | X | | | |
| Additions/Deletions | | X | X | | | |
| Knowledge of Filing Media | | X | X | | | |
| Transfer to Other Media | X | | | | | |
| Coding, Modifying, Corrections | X | | | | | |
| Design of Forms | | | X | | | |
| Design of Formats | | | X | | | |
| Office Administration | | | X | | X | |
| Supervisory Practices | | | X | | | |
| Selection of New Employees | | | | X | | |
| Training of New Employees | | | | X | | |
| Scheduling/Organizing Keyboarding of Material | | | X | | | |
| Coordination of Work Flow | | | | X | | |
| Coordination of Users | | | | X | | |
| Coordinate Equipment with Users | | | | | | |
| Maintain Effective Working Relationships | | | X | | | |
| Act as Supervisor in Absence of Supervisor | | | X | | | |
| Attend Meetings | | | | X | | |

| SKILLS/ ABILITIES | WP I | WP II | WP Spec | WP Supv | WP Sec Sup C | WP Mgr |
|---|---|---|---|---|---|---|
| Responsible for Quantity/Quality Control | | | | X | | |
| Select and Evaluate WP Equipment for Center | | | | X | | |
| Represent WP Manager at meetings | | | | X | | |
| Make Recommendations about WP System | | | | X | | |
| Act as Supervisor of DSHS WP in absence of WP Manager | | | | X | | |
| Performance Evaluation Procedures | | | | | X | |
| Establish Procedure Manual | | | | | X | |
| Production Controls | | | | | X | |
| Establish Records for Review | | | | | X | |
| Coordinate with Director and Div. Mgrs. | | | | | X | |
| Establish Tape Library--Files Retrieval | | | | | X | |
| Act as Liaison with DP Service Center for WP Center Equipment | | | | | X | |
| Responsible for Update on Current Procedures and Methods | | | | | X | |
| Participation in Workshops--Cont. Ed. (Learn new methods) | | | X | | X | |
| Plans, Organizes, Develops and implements Statewide Admin. Support | | | | | | X |
| Knowledge of Govt. Organization and Agency WP Procedures | | | | | | X |
| Evaluation and authorization of Purchasing WP Equipment | | | | | | X |
| Supervise Large Groups | | | | | | X |
| Preparation of WP Budget Data | | | | | | X |
| Coordination of WP User Needs with WP Center | | | | | | X |
| Provision of Technical Advice | | | X | | | |
| Types of Material: | | | | | | |
| Envelopes | X | | | | | |
| Mailing List | X | | | | | |
| Short Reports (1-5 pages) | X | | | | | |
| Long Reports (over 5 pages) | | X | | | | |
| Simple Form Letters | X | | | | | |
| Simple Transcription | X | | | | | |
| Advanced Transcription | | X | | | | |
| Reports containing Medical/ Legal Terms | | X | X | | | |
| Multiple Revisions | | X | X | | | |
| Forms with more than Four Variables | | X | X | | | |
| Contracts | | X | | | | |
| Complex Forms | | X | | | | |

Qualifications:

H.S. Diploma and one year typing and clerical experience
Successful completion of an approved word processing course
One year of college or business school training in related field

EXHIBIT K

## SENIOR WORD PROCESSING SPECIALIST

Definition: Performs and takes responsibility for the keyboarding of complex material on word processing equipment utilizing advanced records processing, computational, and data communications features.

Distinguishing Characteristics: Formats, produces, and revises complicated lengthy technical documents and statistical reports from complex source files. Exercise independent action when interpreting instructions to produce a quality document, understands proofreader marks, and assumes full responsibility for document accuracy and completeness. Frequently uses records management to produce formulated reports and documents. Frequently uses data communications to transmit documents.

Material most Senior Word Processing Specialist perform include:

Long reports (over 5 pages) and letters of a general nature.

Reports and letters that contain medical, legal, or business terminology, and complex charts and graphs.

Uses advanced word processing features to format tables and special reports.

Uses computational capabilities of word processors to extend and reformat numbers via preprogrammed instructions to produce statistical tables.

Form letters containing more than four variables.

Assembles contracts, memorandoms of agreements, personal service agreements using records processing techniques and advanced editing revision keyboard commands.

Link word processing equipment with other word processors or data processing equipment and transmit data electronically.

Knowledge and Abilities:

Knowledge of: Office practices and procedures; business English, simple arithmetic, high school Algebra, spelling, vocabulary, basic programming concepts, file structures, and principles of operating disc or tape controlled advanced word processing equipment.

Ability to: Type rapidly and accurately; apply clerical procedures; understand and follow directions; proofread smooth and rough copy, apply advanced techniques to improve productivity.

APPENDIX 3--Curriculum


| | | |
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EXHIBIT L

PROPOSED COURSE

I. Course Title: Data Communications for Information Processing

II. Course Scope:

To prepare the student for using various methods of data communications between word processors and also between word processors and data processing equipment.

III. Course Objectives:

At the completion of the course, the student will be able to:

A. Describe the difference between the most commonly used communications protocols.
B. Describe the basic steps in linking word processors to another word processor or data processor for the purpose of transmitting information.
C. Prepare all the necessary information for ordering communicating equipment from the phone companies or private providers of data communications equipment.
D. Work with these companies to diagnose phone line problems.
E. Describe the components and functions of a modem.

IV. Course Content:

A. Basic communications theory
B. Components and operation of an asychronous modem
C. Components and operation of an bisychronous modem
D. Dial-up switched phone services/speeds
E. Point-to-point phone services/speeds
F. Multi-point phone services/speeds
G. Common carrier tariffs for data communications
H. Start/stop protocols
I. Synchronous protocols
    1. IBM 2770
    2. IBM 2780
    3. Hasp work station
    4. 3270 data station
J. Trouble-shooting data communications equipment
K. Hands-on laboratory using switched low speed asychronous equipment
L. Hands-on laboratory using switched sychronous equipment

VI. Evaluation:

| | | |
|---|---|---|
| A. | Daily work | 40% |
| B. | Unit tests plus final | 60% |

PROPOSED COURSE

I. Course Title: Programming Concepts

II. Course Scope:

To build a background of concepts and terminology related to data processing and computer programming.

III. Course Objectives:

At the completion of the course, the student will be able to:

A. Describe what a computer (data processor) is and its components.
B. Understand the difference between a field, record, and file structures.
C. Design various files and file structures.
D. Write programs using the Basic programming language.
E. Understand programming terminology and concepts.
F. Operate a data processing terminal.

IV. Course Content:

A. The computer
    1. A definition
    2. Types of computers
        a. analog
        b. digital
    3. Generations of computers
    4. Five functional parts of a computer (hardware)
    5. Types of storage
        a. internal to CPU
        b. external to CPU
        c. addresses for storage
B. Types of computing
    1. Batch
    2. Interactive
    3. Teleprocessing (for both batch and interactive)
        a. turnaround
        b. real time
C. Communicating with a computer
    1. Computer language
        a. machine
        b. symbolic
        c. software
D. Performing a job on the computer
    1. Logic
        a. block diagram or flow chart
        b. decision table
        c. warnier chart

2. The program
    a. code
    b. test and debug

E. Intro to time share terminals
1. Sign on - sign off procedure
2. Return carriage & break keys
3. Sample program

F. Practice with block diagrams (flow charts)

G. Intro to BASIC

| | | |
|---|---|---|
| 1. | LET | to initialize an area |
| 2. | PRINT | to output alpha and numeric data |
| 3. | LET | to compute |
| 4. | PRINT | to compute and print |
| 5. | PROMPT | |

H. Labels
1. A thru Z
2. A0 thru Z9
3. A$ thru Z$

I. Some system commands

| | | |
|---|---|---|
| 1. | LIST | lists program presently in the CPU |
| 2. | RUN | runs program presently in the CPU |
| 3. | SCRATCH | destroys the program in the CPU |
| 4. | KILL | destroys the program on disk |
| 5. | NAME | names the program in the CPU |
| 6. | SAVE | places program in CPU on disk |
| 7. | CATALOG | shows programs that are saved |
| 8. | GET | brings to CPU program from disk |

J. More block diagrams (demo)
1. straight line
2. loops
3. decisions
4. control breaks

K. More language commands

| | | |
|---|---|---|
| 1. | REMARK | to enter remarks as documentation |
| 2. | GO TO | the absolute branch |
| 3. | IF-THEN | the decision (conditional branch) |
| 4. | TAB | tabbing on the print line |
| 5. | INPUT | enter data from the keyboard |

6. READ
    a. needs data statement
    b. takes data in sequence
    c. can read multiple data with one statement
    ie: READ A, B, C
7. DATA
    a. places data in the program for the READ statement
    b. may be numeric or alphanumeric or a mix
    ie: DATA 146, "ABC", 3690
8. RESTORE — resets the READ-DATA pointer
9. DIMENSION
    a. alphanumeric
    b. numeric

V. Evaluation:

| | |
|---|---|
| Tests | 35% |
| Programs | 65% |

Grading:

| | |
|---|---|
| 95 - 100 | A |
| 89 - 94 | B |
| 81 - 88 | C |
| 75 - 80 | D |

PROPOSED COURSE

I. Course Title: Systems Analysis for Information Processing

II. Course Scope:

To familiarize students with the system development process and problem-solving techniques.

III. Course Objectives:

At the completion of the course, the student will be able to:

A. Recognize the basic steps in the system design process, to include:
   1. User needs statement
   2. User interviews
   3. Feasibility study phase
   4. General design phase
   5. User by-off process
   6. Detail design phase
   7. System implementation phase
   8. Post implementation reviews
   9. System maintenance reviews

B. Use various forms design techniques.

C. Use various report design techniques.

D. Be capable of designing and selecting an appropriate file organization for a given application.

E. Conduct interviews to gather information for designing a system.

IV. Course Content:

A. Introduction to Systems Analysis
   1. Systems and procedures
   2. Company structure
   3. Lines of authority
   4. The Data Processing Department and company structure

B. Initiation of the Systems Project - preliminary investigation
   1. Origination of systems projects
   2. Objectives of preliminary investigation
   3. Defining the scope of the project
   4. Costs and benefits
   5. Conducting a preliminary investigation
   6. Organizational charts
   7. Letters of authority
   8. Conducting interviews

C. Detailed Systems Investigation
   1. Steps in the detailed systems investigation and analysis
   2. Reviewing the organizational structure
   3. The interview

4. Questionnaires
5. Current documents and operating procedures
6. Analysis of facts gathered
7. Presentation of findings

D. Systems Design
   1. Design of systems output
      a. Review of types of available output
      b. Defining output requirements
      c. Designing output reports
   2. Design of systems input
      a. Types of data entry devices
      b. Determining the input data needed to produce the desired output
      c. Designing format of input data
      d. Designing source documents
   3. Design of system files
      a. Methods of file storage
      b. Methods of file organization
      c. File accessibility
      d. File activity
      e. File capacity
      f. File processing speed
      g. File costs
      h. Designing the files
      i. Blocking considerations
   4. Design of systems processing
      a. File processing
      b. Editing
      c. Updating
      d. Sorting
      e. Reporting
      f. Back-up and restore
      g. Start-up procedures
      h. Control functions
      i. Distributing output reports
      j. Documenting the systems flow
   5. Design of system controls
      a. Input controls
      b. Output controls
      c. Organizational controls
      d. Audit trails
   6. Systems design approval - presentation to management
      a. Output reports
      b. Input
      c. File design and processing
      d. Data processing management
      e. Written presentation to management

E. Systems Development
   1. Project management, scheduling, and control
      a. Defining tasks and subtasks
      b. Hiring and training personnel
      c. File conversion

2. Programming assignments and specifications
   a. Programming languages
   b. Programming staff
   c. Developing programming specifications
3. Programming, testing, and documentation
   a. Development of program logic
   b. Coding
   c. Program testing
   d. System testing
   e. Program documentation
   f. Operations documentation
   g. Run books
   h. Management and user documentation

F. Systems Implementation
   1. File conversion
   2. Conversion methods
   3. Implementation of the system
   4. Post-installation evaluation
   5. Final report to management

V. Evaluation:

| | | |
|---|---|---|
| A. | Class Participation | 10% |
| B. | Case Study | 50% |
| C. | Tests | 40% |

EXHIBIT M

PROPOSED CURRICULUM

| | Word Processing Specialist Certificate | Terminal Operator Certificate | Information Processing Management Degree |
|---|---|---|---|
| Typing 1 | X | X | X |
| Typing 2 | X | X | X |
| Typing 3 | X | X | X |
| Machine Transcription | X | | X |
| English Composition | X | | X |
| Business English | X | X | X |
| Business Communications | X | | X |
| Technical Report Writing | | | X |
| Speech | | | X |
| Word Processing Concepts | X | | X |
| Word Processing Operations | X | X | X |
| Word Processing Applications | X | | X |
| Introduction to Data Processing | X | X | X |
| Analysis of Information Processing | | X | X |
| Programming Concepts (Basic) | | X | X |
| Teleprocessing | | | X |
| Microprocessors Concepts | | | X |
| Finite Math | | | X |
| Algebra | | | X |
| Accounting Principles | | | X |
| Records Mgmt | | X | X |
| Office Mgmt | X | X | X |
| Personal Mgmt | | | X |
| Supervision | | | X |
| Psychology | X | | X |
| Human Relations | X | | X |
| Organizational Comm | | | X |

EXHIBIT N

# PLAN FOR STUDENT SERVICE CENTER

## Billing

Rates for services would be published and budgets established at the beginning of each term. Services would be requested via a work order. Center users would indicate the priority and type of work needed on the work order or by phone. A sample work order is included.

The rate structure, priorites, and corresponding billing multipliers are outlined below.

| Priority | Turnaround | Cost Multiplier |
|---|---|---|
| Deferred | 48 hours | .5 |
| Standard | 24 hours | 1.0 |
| Rush | 8 hours | 2.0 |
| Priority Rush | 2 hours | 4.0 |

The user's bill would be derived by determining the basic cost for a service and then multiplying that cost by a cost multiplier for the priority requested on the work order. Various services would be billed by:

- minutes of dictation
- words/pages typed
- length/size of documents stored
- pages copied
- time spent preparing document
- supplies provided

A rate would be published at the beginning of a term for each service. Once each month a bill of services provided would be prepared by center staff. Each deparment billed would prepare a transfer voucher for services rendered. Any billing reconciliation or complaints would be handled by center staff.

## Budgets

Once each term the center coordinator would meet with administrative and department staff to review performance and establish an allocation for the center. The budget process would also be used to assign authorized users and accounts. The resulting budget would then be used to determine staffing and equipment requirements for the term.

Staffing

A recommended staff should include the following:

| | |
|---|---|
| Center Coordinator | Faculty member |
| Student Supervisors (2) | Paid student aides, drawn from the second year of the Information Management program. One would supervise the morning "staff;" and one the afternoon.<br><br>Their responsibilities would include:<br><br>. conduct staff meetings<br>. manage the center<br>. provide needed supplies<br>. assign work<br>. record billing information<br>. log work orders<br>. proof documents<br>. distribute documents<br>. assure center standards<br>. act as a liaison between center staff and users |
| Student Word Processing Specialist (4) | Students who have completed the theory, equipment operation, and language skill components of the Information Processing program with a "B" or better grade average. Two students would work each shift.<br><br>Their responsibilities include:<br><br>. operate the various types of equipment in the center<br>. complete documents as assigned by the student supervisor<br>. meet established quality standards<br>. use text-editing features to create or revise documents<br>. code special applications<br>. become familiar with department and campus practices<br>. perform other duties as assigned |

Equipment

The following suggested equipment would support a two-campus institution, such as Olympia Technical Community College and Centralia Community College, where documents could be transmitted electronically.

- Central dictation system
- Two word processors (Displaywriters) each with
  - Video display and keyboard
  - Quality printer with forms feed
  - Records management software
  - Communications software
  - Communications adapter
  - 1200 dial-up BPS asynchronous modem (212A)
- Two phones
- Two memory typewriters
- Access to copier
- Adding machine

Locating the center in a separate room with adequate floor space and properly placed electrical outlets would be preferred. If possible, there should be a receiving area where work could be brought in or picked up. The acting supervisor, working out of that area, could answer the phone, monitor the dictation system, service priority requests, etc.

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